THE DOCK & HARBOUR AUTHORITY

No. 114. Vol. X. APRIL, 1930.

Editorial.

The Port of London Authority.

On Monday last, March 31st, the Port of London Authority celebrated its twenty-first birthday; the year of its inception being 1909. Previous to the Port of London Authority being constituted, the management was vested in three private dock companies, but the state of affairs was so bad that a royal commission was formed to investigate matters and, after the presentation of their report, the "Port of London Act" received the royal assent, and the Authority came into being.

The Authority at once adopted the go-ahead policy which the past 21 years have amply proved, each succeeding year showing further steps of progress. New docks were built, the river was dredged and widened, and the necessary facilities for unloading and loading of ships together with ample warehouse accommodation was provided with the view to attracting larger vessels. The thoroughness of the Authority's undertakings and their prevision in providing more accommodation was amply rewarded by the tremendous increase in the number of vessels calling at the Port of London, and also in the vast uplift in traffic figures.

The Port of London's supremacy over other English ports with regard to tonnage of vessels loaded and unloaded shows a tremendous margin, as in 1928 the traffic figures for London were 55,449,152 net registered tons, the nearest competitor being Liverpool with 33,118,061 net registered tons, whilst in 1929 the Port of London's figures had increased by over two million net registered tons, the figures being 57,546,136 net registered tons, which represents an increase of 9.6 per cent. of the total increase for the whole of the ports of the United Kingdom.

The Authority is by no means at a standstill, as further developments are in hand, and as recently as September of last year, the new dock at Tilbury was opened with the object in view of attracting larger passenger-carrying vessels; and the ready success of this venture has amply proved its necessity.

We wish the Authority every success on attaining their majority and feel certain that each succeeding year will prove another milestone of progress.

The Port of Karlstad, Sweden.

Another Swedish port has been taken as the subject for this month's supplement, viz: The Port of Karlstad, which is situate on the north shore of Lake Vänern, just where the Klara River flows into this lake.

From historical records, Karlstad was first used as a port in the year 1580, though in 1800 its position as a trading centre was still very insignificant.

However, towards the end of the 19th century, Karlstad, together with other ports in Sweden, commenced to modernise its port equipment, as trade throughout Sweden was steadily increasing.

Karlstad has direct communication by water with Stockholm and Goteborg by means of canals, and is therefore a natural centre for imports for the hinterland of Sweden.

The traffic figures for the harbour of Karlstad proved the necessity for further developments and improvements as in 1900 the number of vessels arriving and departing were 1,849, with a total net tonnage of 207,522, whilst in 1926 3,049 vessels arrived and departed with a tonnage of 342,350.

An illustrated article giving full details appears on another page.

The Harbour of Randers.

The fjord of Randers is to be dredged so that the 34-kilometre navigable waterway from the city of Randers and out to Cattegat will have a minimum depth of 7 metres. The dredging involves the removal of $2\frac{3}{4}$ mill. cubic metres of fill.

The Harbour of Danzig.

A rather large programme is planned for the extensions of the harbour of Danzig, the most important of these being the building of a warehouse for sugar in the free port, and a quay, about 260 metres long, south of the Weichsel station, intended for ships with a draft up to 8 metres. Four new cranes are also to be built.

Why Ports are Half Idle.

In his speech at the annual meeting of the Manchester Ship Canal Co. the chairman appealed for a relaxation of the trade union restrictions on overtime at the docks, thus reviving a question on which employers and workers have long held different views. In Manchester, as at other British ports, there is a 44-hour week—from 8 until 12 and from 1 until 5 from Monday to Friday, and from 8 until 12 on Saturday. Overtime is worked when necessary from 6 a.m. to 8 a.m. at double rates and from 6.15 p.m. to 10.15 p.m. at a rate-and-a-half. The facilities of the port, if worked normal hours, are consequently used at less than one-third of their capacity, and, under the overtime restrictions, they could not be worked at much more than half capacity. In a word, it is submitted the capacity and the capital employed are approximately half idle. Efforts have continually been made to institute a limited night shift at Manchester docks, but without success. What shipowners want most is a quick "turn-round" for their vessels. If they get this the vessels will return all the sooner, and thus provide more employment.

The Harbour of Copenhagen.

The Harbour Administration intends to spend about 2.5 mill. kroner on different works. The largest part of this amount, 2.2 mill. kroner, is to be used on the 10-metre basin, north of the present free port. A quay 340 metres long is to be built, and the water area in front of it is to be dredged to a depth of 10 metres.

Improved Revenue from Ribble Docks.

At the Preston Town Council meeting Alderman Ellison reported the revenue from the Ribble Docks for the first ten months of the current year was £20,189 in excess of last year. Wood pulp imports were 232,926 tons, the largest import of that commodity Preston had ever had in any previous twelve months. It was likely there would be an import of 250,000 tons for the year ending March 31st, 1930. The revenue at the docks in January was £20,094, as against £7,154 in January, 1914.

The Russian Harbours.

The programme for helping the Russian industry also takes into consideration a remodelling of the harbours and the construction of new ones. The present harbours are neither large enough nor modern enough in their present state. The loading of a ton of grain, for instance, costs in the harbour of Rostow up to 6.43 roubles, and in Odessa from 1.67 to 4.68 roubles. Loading of coal in Marinpol costs up to 1.40 roubles a ton.

There is not enough mechanical equipment at hand, so the loading takes too much time. In Archangel it takes two weeks, on an average, to load a shipment of wood. In Poti it takes the same time to load an ore freighter. Also, the dredging is not carried out with sufficient energy.

A five-year programme is planned to correct all these wants, and more than 200 mill. roubles is to be spent on all the harbours at the White Sea, the Black Sea, the Caspian, Sea, etc.

The old harbours are to be repaired, dredged, and furnished with mechanical equipment; the harbours of Archangel, Murmansk, and Kem specially with the export of wood in view. New harbours are to be built at Onega and Mexen, on the White Sea, for this purpose.

New Lightship for Persian Gulf.

THE Gas Accumulator Co. (United Kingdom), Ltd., lighthouse and marine lighting engineers, Beacon Works, Brentford, have received an order for a lightship which is intended for service at the head of the Persian Gulf. The lightship was built to their order by Messrs. J. Crichton & Co., Ltd., and equipped by themselves.

"Aga" Unwatched Light Vessel about to leave Shipyard.

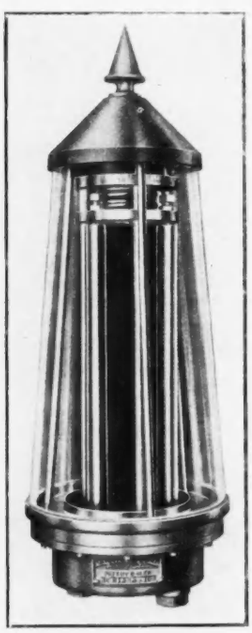
The automatic equipment with which the vessel is fitted is only unusual in that lightships without a crew are not common.

The apparatus in question belongs to what is known as the Aga system; a combination of unique devices in which dissolved acetylene gas is the illuminant used, while carbonic acid gas is the motive power for the self-acting fog bell.

Both the light and fog signal mechanisms, as supplied by them, have been used in the Trinity House service for many years; and the Aga system has been established as the standard for unwatched navigating lights for year past all over the world.

Practically every light on the Mersey has been converted to the Aga system; and there the usual unwatched period of a year has been adopted—that is to say, each light performs its allotted functions for a year at a time without attention from anyone.

This particular lightship has been arranged to work for six months at a time. The light she exhibits is a triple flashing one. The revolving lens is composed of six separate catadioptric panels, arranged in two groups of three. Each of the six



"Aga" Sunvalve.

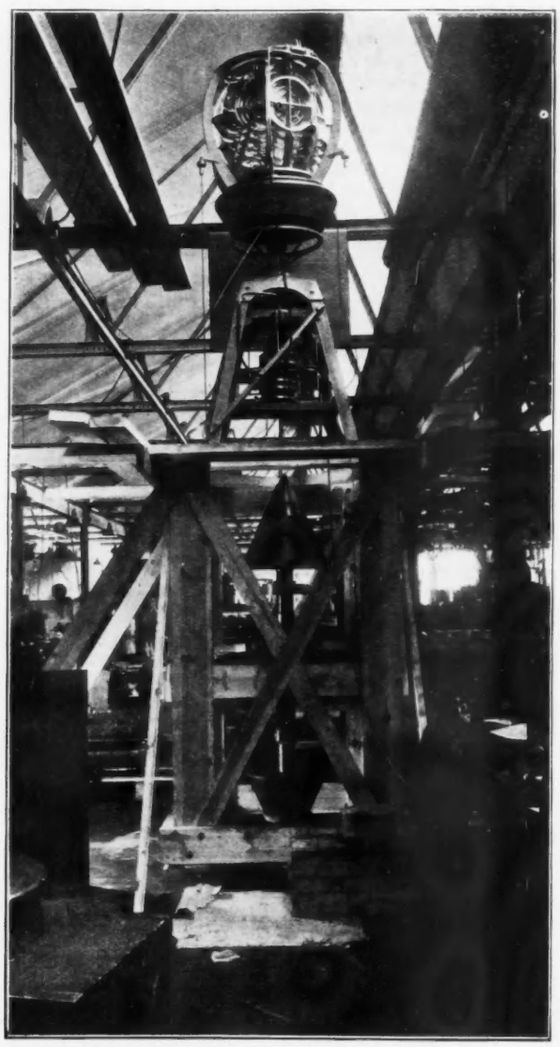
panels projects a beam equal to 40,000 candles from a single incandescent burner at the focal point; and with the rotation of the lens the optical effect is that of a group of three flashes occupying about 8½ seconds and recurring every 20 seconds.

The burner is supplied with a mixture of dissolved acetylene and air in fixed proportions, produced from a form of automatic aspirator called a mixer. The combustion of the mixture results in a hot non-luminous flame, which incandesces a mantle.

The pulsating action of the mixer is made use of to drive the lens round at the determined speed; but no more gas is used on this account than if the burner were used in a stationary lens.

The light is controlled by a light valve, so that it is only in action when natural light fails, irrespective of the hour.

The light valve (popularly known as the sun valve) is another original Aga conception. Its action results from the fact that a body which absorbs all light falling upon it will, in consequence, develop a higher temperature than an all-reflecting body similarly exposed. It takes the form of three light-reflecting vertical metal rods, symmetrically disposed round a central dead-black metal cylinder, the whole being protected by



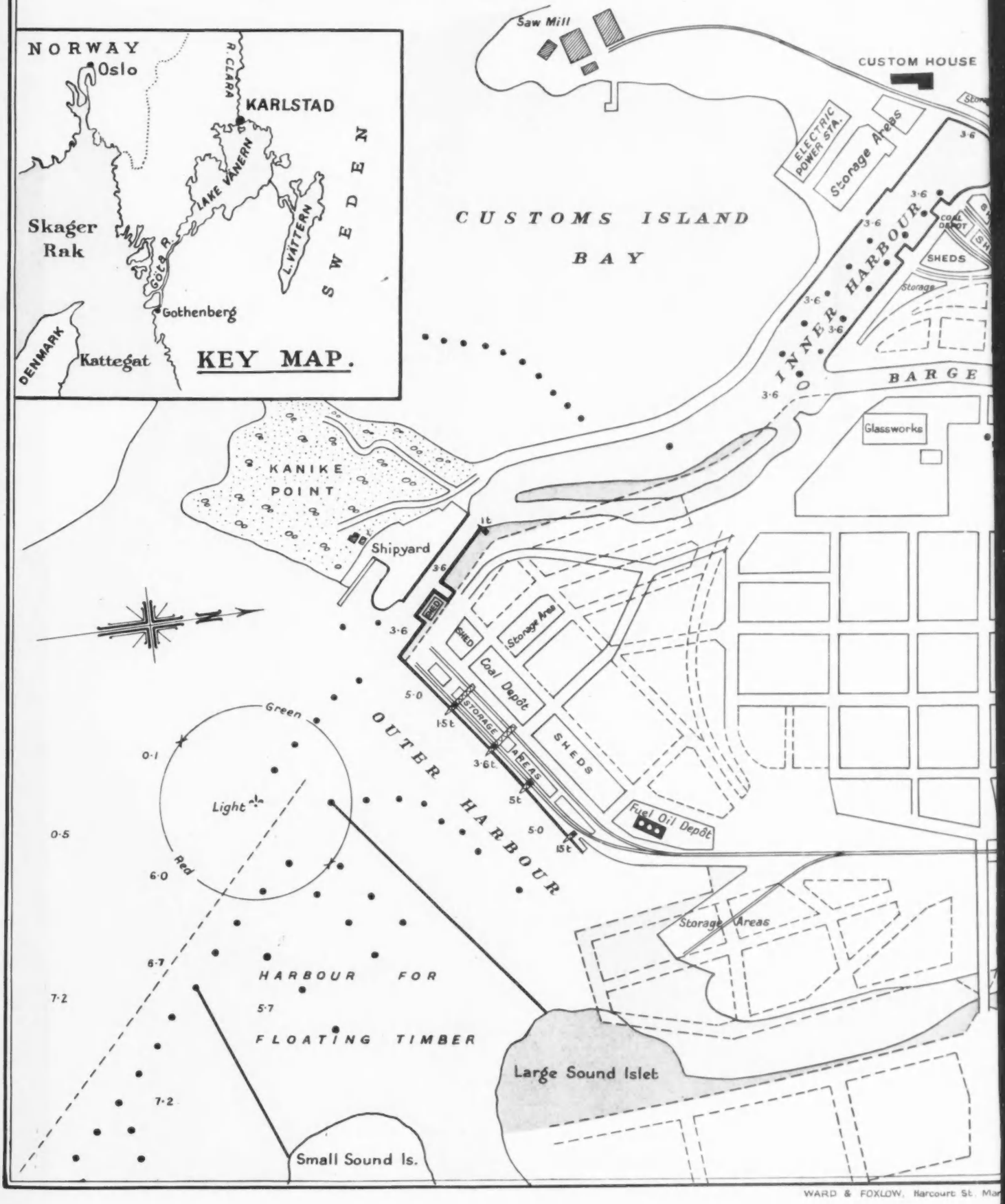
"Aga" Automatic Revolving Optic, Lighting Apparatus, and Constant Level Mounting, set up for Works' Test.

a strong glass sleeve. Upon exposure to light, the light-absorbent cylinder increases slightly in length, whereas the reflecting rods remain unaltered. This slight difference is magnified in a simple and direct fashion and suffices to close a gas valve. When light fails the contraction of the absorbent element allows the gas valve to open, and the gas passes again. Heat and cold have no effect upon the light valve, because then it only expands or contracts as a whole, and there is no such relative displacement as is caused by exposure to light or darkness.

The light valve is adjustable as to sensitiveness and can respond to the passage of a dark cloud in full daylight. Thus the navigating light on this ship, controlled by the light valve, is extinguished every morning at sunrise, and the lens also ceases to rotate. At sunset it lights up again and the lens action recommences; and that condition is maintained throughout the night.

PORT OF KARLSTAD.

(SWEDEN)



WARD & FOXLOW, Harcourt St. Mar

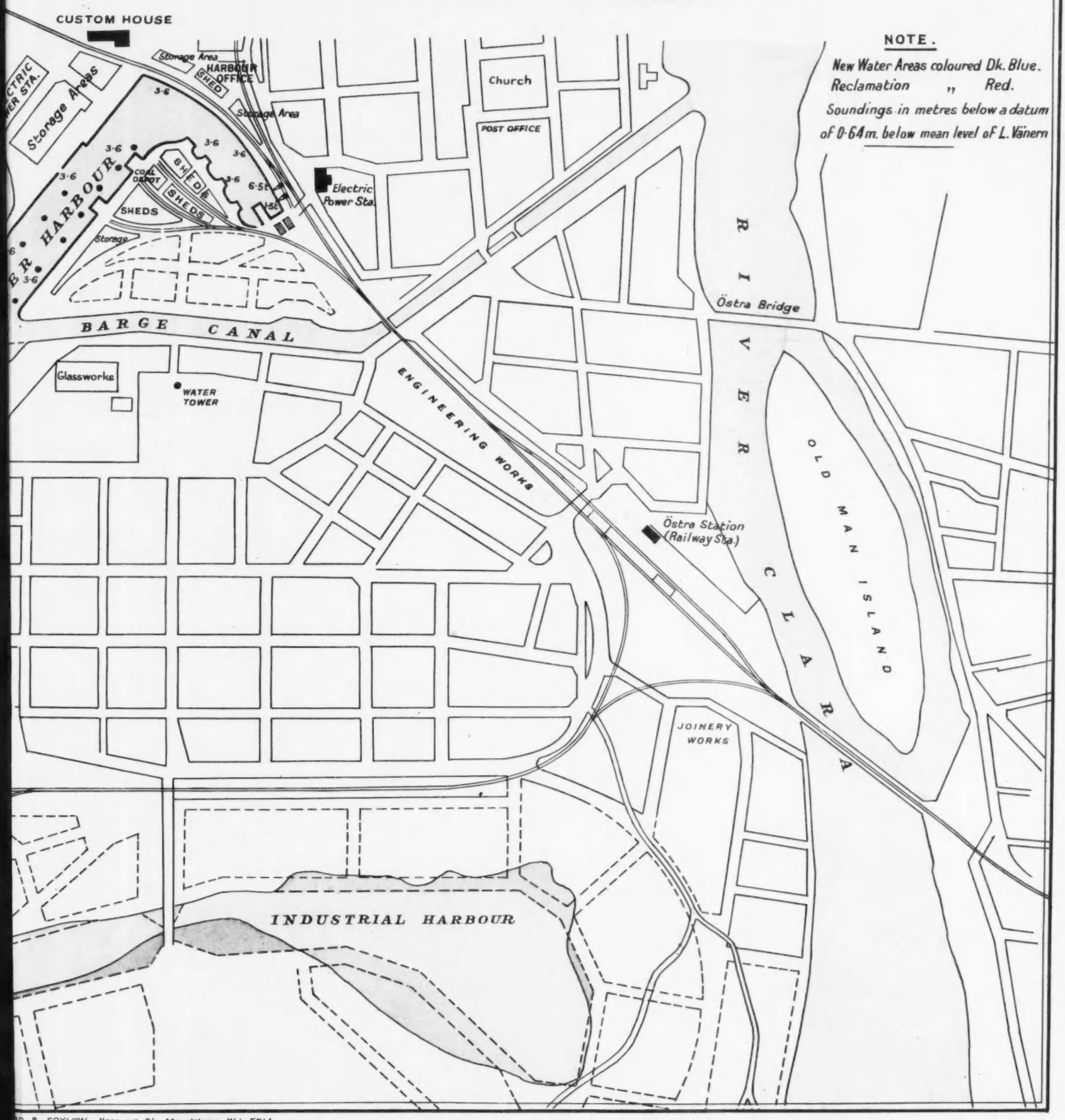
CK AND HARBOUR AUTHORITY, APRIL, 1930.

UNDER THE JURISDICTION OF THE KARLSTAD HARBOUR BOARD.

Scale of Metres.

METRES 100 50 0 100 200 300 400 500 600 700 800 900 1000 METRES

1 METRE = 3·28 FEET.



NOTE.

New Water Areas coloured Dk. Blue.
Reclamation ,, Red.
Soundings in metres below a datum of 0·64m. below mean level of L. Vänern

RD & FOXLOW. Harcourt St. Marylebone. W.1. 5514.

New Lightship for Persian Gulf—continued.

It is only the main light which is thus affected. A small pilot jet remains burning night and day, and from this the main burner is ignited.

Since this light has to be left alone for six months at a time, it is necessary to provide against a breakage of the incandescent mantle, which is an inverted one. This is accomplished by another original Aga device, which, as soon as the mantle in use is so broken as to diminish the light, is automatically removed, and a new one, drawn from a magazine, is placed over the burner nozzle. This mechanism is exceedingly simple and quite dependable; and of robust construction, despite the apparent delicacy of the duty it has to perform.

It has to be remembered that a lightship does not afford a steady platform, as a shore light does; therefore, something has to be done to prevent the light beams being thrown above and below the line of vision when the ship rolls and pitches. The Aga system, therefore, includes a particular form of pendular support for the lens. In this arrangement the lens is carried on a universal ball-bearing joint, whose central point coincides with the centre of gravity of the lens. Thus the lens is in a condition of neutral equilibrium. Inside the tubular mast, and at the foot of it, a stabilising weight is suspended from a universal joint. This weight is connected with the lens by pull wires. As the ship inclines the stabilising weight remains hanging plumb and, through the pull wires, compels the lens in the lantern to float level also.

The method employed heretofore for keeping the lens level was merely a pendulum in the lantern, consisting of a rod mounted in gimbals, with the lens at the upper end and a bob weight at the bottom. Unless balanced to a nicety (which is not always possible), this pendulum becomes so unruly in bad weather that it is frequently necessary to lash it down, thus rendering the whole thing useless. In similar conditions the Aga suspension quietly maintains its level, despite the oscillations which the ship is subjected to by the sea.

The fog bell has a gong weighing half a ton. It is sounded by a plunger or piston rod which is driven smartly and sharply forward on its cylinder with great energy by carbonic acid gas at definite and regular intervals. The bell and its striking mechanism are placed on deck, and in the ship in question the bell is tolled once every half-minute. Like the light, the fog bell is governed by a light valve, so that it sounds whenever the light is in action.

The cylinders containing the dissolved acetylene (called gas accumulators) and those containing the CO_2 gas are stowed in symmetrical battery formation below deck. They are all of the same size and are easily handled, a light derrick being fitted on deck to facilitate their removal and replacement every six months.

The lightship in its finished condition—or virtually so (for the lens was removed in case of breakage)—a total weight of some 130 tons, was lifted on board the transport ship by that vessel's own gear. She is now being carried to her destination, and on arrival the carrying ship will deliver her afloat and she will be handed over in working order as far as her equipment is concerned. This signalises a remarkable development in the handling and transport of cargo made up of a few masses of great weight, which otherwise might entail the expense of large floating cranes, and perhaps other special arrangements.

Port of Southampton Topics.

New Cunarder.

SOUTHAMPTON has been particularly interested in the announcement that the Cunard Line contemplate building a new steamer for their Atlantic express service. Southampton is the home port of the "big three" Cunarders, the "Berengaria" (52,226 tons), "Aquitania" (45,647 tons), and the "Mauretania" (30,695 tons), which maintain that Line's present express service, and the addition of a newcomer will give further kudos to the port.

Although no details are as yet available, it can be taken for granted that the new vessel will be the largest liner ever built, and also that she will be designed with the idea of making her the fastest. She will no doubt be the British challenger for the "Blue Riband" of the Atlantic, which was wrested from the "Mauretania" last summer by the new North German Lloyd liner "Bremen." To regain this honour for Britain she will have to attain an average speed of about 30 knots, for the Bremen averaged nearly 28 knots on her record-breaking voyage.

The advent of the "Europa" makes the situation all the more interesting, but there is no doubt that the Cunard Line will make sure that the type of engines installed in their new boat will give good results. Speed, however, is not everything, for steadiness and reliability are important. From the commercial point of view it is better to have a slower vessel full of passengers attracted by her steadiness than a record-breaker with her accommodation only partly filled.

Visit of "Europa."

One of the principal events of the month so far as Southampton shipping interests are concerned has been the visit of the new North German Lloyd liner "Europa" on her maiden voyage to New York. When the new vessel called on March 20th a large party was invited to inspect her in Cowes Roads and she created a very favourable impression. She is very similar to her sister ship, "Bremen," which entered service in July last year, and which has wrested the "Blue Riband" of the Atlantic from the Cunarder "Mauretania," but the experience gained has led to modifications and improvements. The "Europa" has been built for speed, and although her average for several hours steaming on trials—27.67 knots—was slower than that of her sister ship, she has now eclipsed the Bremen's performances. Among the differences between the two ships are the stem, which in the case of the "Europa" is more bulbous than that of the "Bremen," and the funnels, which are oval instead of stream-lined. The "Europa" represents the last word in the direction of safety devices. She has a double bottom running the full length of the hull, and is sub-divided into 15 water-tight compartments. It is claimed that if three compartments in the stern or four compartments in the bow were flooded the ship would still remain afloat. Dr. Philipp Heineken, president of the North German Lloyd, welcomed the visitors who inspected the new vessel.

North German Lloyd Line.

Since the steamer "Munchen" was damaged in New York harbour, the North German Lloyd "team" on the Southampton services has been running one short. Arrangements have been made for the "team" to be completed, but though the identity of the vessel has not yet been disclosed, definite sailing dates have been allocated to her. She will sail from Southampton on June 26th, and will operate in conjunction with the "Berlin" on the schedule that serves Boulogne and Southampton after starting from Bremen, and she will call at the same ports on her way back to Europe.

With the advent of the newcomer in June, the "team" will be at full strength, for the "Columbus," now on a world cruise, will have returned to her normal occupation. The "Columbus," whose re-engining during the winter has given her a greater speed, will make her next sailing from Southampton on May 24th. In June there will be seven departures from Southampton for the United States, and four arrivals from New York, a number which will be approximately maintained throughout the season.

Revolution in Cheap Travel.

The coming trans-Atlantic tourist season is likely to see a revolution in the comforts and luxuries of the cheapest class of ocean travel. The decision of the United States lines to abolish second-class from their steamers and devote all space previously occupied by that class to tourist third cabin travellers, and to assign all accommodation previously occupied by tourist cabin to third-class passengers, is a great step towards the democratisation of ocean travel. The United States Line have been led to take this course by the great growth of tourist third cabin travel, a class introduced since the war. It is a bold step to abolish second-class, which is a fifty-year old institution in ocean travel.

The "Leviathan," which is at present undergoing overhaul in New York, will be the first to embody these changes, and when she sails from Southampton on April 22nd, tourist third cabin passengers will enjoy the comforts and luxuries of the former second-class accommodation. Quota and third-class passengers will in turn be offered improved accommodation.

Statistics for February show Continued Progress.

Southampton Dock statistics for February show continued progress. There is a gratifying upward trend, for although four decreases are recorded, three of these are more than accounted for by the advances inward. The vessels which entered the Docks numbered 222, as compared with 190 in

Port of Southampton Topics—continued.

February, 1929, while those leaving totalled 223, an advance of 29 on the corresponding month. The inward gross tonnage mounted by 46,354, the figure for February this year being 910,778, as compared with 864,424. The outward gross tonnage, however, revealed a decrease—a remarkable feature in view of the fact that there was an increase of 29 in the number of vessels. The falling off in gross tonnage amounted to 28,359, the total being 868,863 as against 897,222 in February last year.

The net tonnage returns showed a proportional reduction outward and an increase inward. The tonnage entering the docks was 494,185, an advance of 24,159, while outward the figure was 462,686, a fall of 12,166. The actual amount of cargo handled increased by 83 tons, for although the inward increase was 5,198 tons, the greater proportion of the total was swallowed up by a decrease of 5,115 tons outward. The actual figures were 40,906 tons inward, as against 35,798 tons, and 41,812 tons outward, as compared with 46,927 tons. Passengers, both inward and outward, showed an advance, the former total jumping by 1,397 to 7,047, and the latter by 177 to 8,750.

New Channel Islands Steamers Arrive.

During the past month the two new steamers which have been built for the Southern Railway Company Channel Islands service have come from the yard of the builders, Messrs. William Denny and Bros., Ltd., of Dumbarton, and the first, the " Isle of Jersey," entered the service about the middle of the month. Her sister ship, the " Isle of Guernsey," has been prepared for service and will follow the " Isle of Jersey " as soon as the volume of traffic demands her presence.

These new vessels set a new standard in cross-Channel traffic. They are " liners in miniature," and their equipment embodies many of the latest innovations to be found on vessels twenty times their size. They are luxuriously fitted with beautiful upholstery, concealed lighting, soft carpets, and parquet floors.

Both ships are oil-burning turbine steamers, their principal dimensions being:—Length (over all), 306-ft.; breadth (moulded), 42-ft.; depth (moulded, to main deck), 16-ft.; and gross tonnage, 2,143 tons. Each vessel carries 1,400 passengers, of whom 800 are first class and 600 are second class, while the crew number 60 persons. The hull is sub-divided by twelve transverse watertight bulkheads extending to the main deck, with watertight doors between the engine and boiler rooms and the tunnel compartments. A double bottom has been fitted, extending over the whole of the vessel's length, an unsual feature in cross-Channel steamers. The vessels are equipped with steam deck machinery, electric light, wireless telegraphy, including an auto-alarm and a direction-finder, an electric submarine signal fathometer, and an electric log.

Before the " Isle of Jersey " made her maiden voyage shipping representatives and members of Southampton Corporation made a trip down Southampton Water at the invitation of the Southern Railway Company. In proposing success to the new vessel, Lieut.-Colonel Gilbert S. Szlumper, Assistant Manager of the Southern Railway Company, said that cross-Channel passengers in these days were apt to expect the luxury of the Savoy, the convenience of a skyscraper, the steadiness of the Majestic, and the speed of a destroyer, all for the price of a ride in a London taxi. The Channel Islands trade was a very difficult one, and was of the type that was a bugbear to any transportation undertaking, inasmuch as the traffic fluctuated considerably. They had a tremendous rush in the summer and during the holiday periods, and at other times there was little demand for accommodation.

Southampton Master Mariners' Club.

Details of the scheme which aims at closer co-operation between aircraft and the merchant fleet were given to members of the Southampton Master Mariners' Club at a luncheon meeting by Flight-Lieut. H. W. St. John, D.F.C., of Calshot R.A.F. Base. There has recently come into effect a scheme of signalling between the aircraft at Calshot and the liners using the port of Southampton. The scheme, which was introduced by the Air Ministry in co-operation with shipping Companies, provided for wireless and visual trials to be made between aircraft and ships. Calshot was especially favoured as it was so close to Southampton, and visual signalling was concentrated upon. The first trials were not successful owing to the fact that, although the vessels were equipped with daylight signalling lamps, they could not train or focus them at any angle above the horizon. The difficulty was overcome by the Air Ministry supplying a number of Aldis signalling lamps on loan to the shipping Companies. The trials then were fairly successful, signals being exchanged with some of the big ships.

Flight.-Lieut. St. John said that from the point of view of the special work of coastal reconnaisance the closer liaison between the two services was most desirable, and he suggested that super flying boats might in the course of time form part of the equipment of shipping Companies' fleets.

New Motor Ship to Call at Southampton.

The Rotterdam Lloyd new motor ship " Baloeran " will make her maiden voyage from Southampton on Good Friday (April 18th), and the Company have made arrangements for a series of interesting tours originating at Southampton. There are five trips to the Mediterranean, and in each case the outward run will be made by the " Baloeran." The Company's liner " Tabanan," when she brings home the " Baloeran " tourists, will be making her last visit to Southampton. Her sister ship, the " Tambora," has already gone off the service. Both these vessels are the " victims " of the remarkable progress that has been made by the Rotterdam Lloyd since the war. In all respects, speed, size, and luxury, the Batavia service has developed in a striking manner. The " Tabanan " and " Tambora," with their approximate tonnage of 5,500, were the largest vessels of the fleet when they appeared in 1908 and 1909. They were still big units in the fleet after the war, and, in fact, it was not until the " Slamat " appeared in 1924 that the Rotterdam Lloyd could boast of having a vessel of over 10,000 tons. The Slamat was the last steamer ordered, for the mail vessels since placed on the service have been motor ships. The " Baloeran " is one of a pair of such vessels, and the difference in her tonnage compared with that of the last ship placed on the service, the " Sibajak," represents approximately the tonnage of the " Tabanan," the " Sibajak " being of 12,500 tons and the " Baloeran " of 18,000 tons.

Dividend of Vickers, Ltd.

The Directors of Vickers Limited declare, subject to sanction in general meeting, a dividend for the year 1929 at the rate of 8 per cent. per annum, less income tax at 4s. in the £, on the Ordinary shares of the Company.

This dividend will be paid on Friday, the 4th April, 1930.

Proposed Re-organisation of Hamburg Port Authorities.

A Bill is shortly to be presented to the Hamburg Assembly by the Senate proposing the amalgamation of the management of waterways and port construction (Strom-und Hafenbau) with the Department for Trade, Shipping, and Industry (Deputation fur Handel, Schiffahrt, und Gewerbe).

Order for Vickers-Armstrongs, Ltd.

Messrs. Vickers-Armstrongs Ltd. inform us that they have received an order for a first-class passenger liner for Furness Withy and Co. Ltd., London. We are definitely informed by the Company that it means the immediate opening of the Naval Shipyard at Walker, which it will be remembered has been closed for the past eighteen months.

The main propelling machinery for the ship will be manufactured by the General Electric Company of Birmingham, acting in collaboration with the Marine Engineering Department of Vickers-Armstrongs at Barrow-in-Furness, where the boilers and marine auxiliaries will be made.

It is estimated that the ship will employ an average number of 1,500 men for eighteen months, in addition to a large number of men who will be employed in other works in the production of auxiliaries and raw material.

Large Post-war Expansion at Canada's Pacific Ports.

According to the Vancouver correspondent of the " Financial Times " (Montreal), the rapidly expanding overseas trade of Canada is being vividly reflected in the expansion of waterborne commerce through British Columbia ports. Canadian products are now finding an ever-growing market in countries bordering on the Pacific Ocean, as well as in the United Kingdom and in other countries forming part of the British Empire. Cargoes are loaded at Vancouver, Victoria, Prince Rupert and New Westminster for shipment to Europe, Japan, China, India, Australia, New Zealand, South America, and other overseas markets.

In 1914 the number of deep-sea ships sailing from British Columbia ports to overseas markets totalled 5,713; in 1921 the number had increased to 7,937; and during the next seven years the number had grown to 8,468 per annum, exclusive of coastwise shipping.

In 1901 the tonnage of deep-sea shipping, both inward and outward, at British Columbia ports, amounted to 1,741,321. The total is now approximately 22,000,000 tons, and coastwise shipping now exceeds 27,500,000 tons. Exports through the port of Vancouver alone increased during the past five years from a total value of $98,598,904 to $152,690,051. In 1921 the westward movement of grain may be said to have begun and the volume exported has increased yearly until Vancouver now ranks second among the grain ports of Canada in respect of export trade. Victoria, Prince Rupert and New Westminster also have grain elevators, and share in the export of grain from Alberta and western Saskatchewan.

The Port of Karlstad, Sweden.

Harbour, Hinterland Communications and the Trollhatte Canal.

Karlstad. Outer Harbour.

Historical.

KARLSTAD, situated just where the Klara River flows into Lake Vänern, has from ancient times been the foremost community on this lake. It was not granted a town charter, however, until the year 1584. Its natural situation had insured it, already several hundred years earlier, a place of prominence, for at this spot the Klara River, which is the chief artery of trade for the Province of Värmland, divides into two main branches encircling an islet, Tingvallaön, which was chosen during the Middle Ages as the seat of the Thing. Hence traders and artisans of all kinds gathered there to barter. It is also a significant fact that already, about 1580, the town had direct trade communication with Lübeck, whither Värmland iron was shipped.

But the town was for all that quite small. In 1800 its population was still not more than 2,165. The present census figure is 20,000.

Situated as it is on the mouth of a large navigable river, with a hinterland rich in iron and timber, the place was predestined to develop into a commercial and seafaring town. At one time salmon fishing played quite a rôle in the industry of the town, though timber and iron were its chief exports. Originally, or in any case during the seventeenth century, the export of forest products predominated. But during the eighteenth century timber was superseded by iron, until in the last century the export of iron gradually dwindled.

During the latter part of the nineteenth century, when modern industry began to revolutionise conditions all over the country, Karlstad experienced a quickening and development far exceeding what had gone before. In Sweden the foundation was now laid for industry on a large scale; steamboat lines were opened, railways were built. The international exchange of goods was greatly stimulated, and raw materials increased in value in proportion to the increasing demand for them for industrial purposes both at home and abroad.

As far as Karlstad is concerned, the completion of the Göta Canal in 1832, the deepening of the Trollhätte Canal in the 'forties, and the building of the North-Western State Railway trunk line in the 'sixties have been decisive factors in the development of the town.

It soon became evident that the harbour must be improved to be able to deal with these new conditions. The first step was taken in the 'thirties by uniting the eastern branch of the Klara River with the northern arm of Lake Vänern, called Hammarösjön, by a canal for barges. The harbour proper—now called the inner harbour—was completed in 1864.

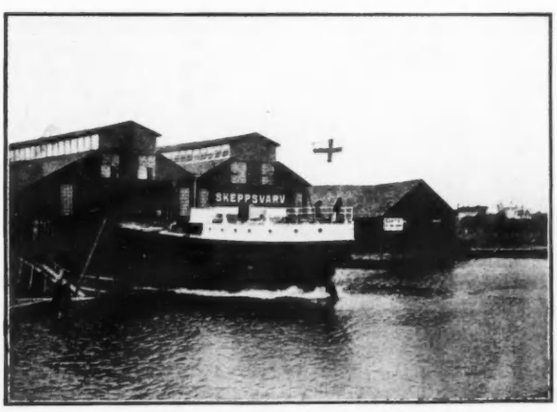
A new epoch—the latest in the development of town and harbour—was ushered in with the further deepening of the Trollhätte Canal in the year 1916, whereby direct communication with foreign ports was made possible.

The large outer harbour had been completed already in 1906 in conjunction with the building of the Karlstad-Munkfors railway. The depth of this harbour has since been increased to correspond with the depth of the Trollhätte Canal, which gives the town added possibilities of development.

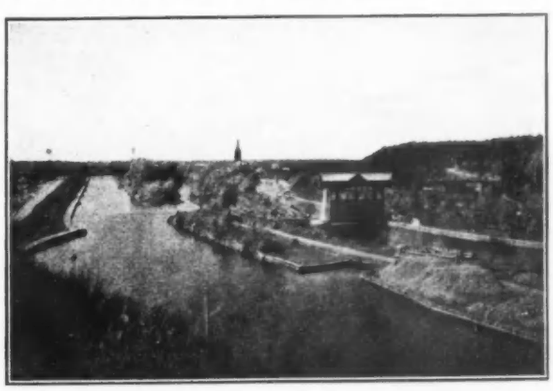
Hinterland and Industry.

As has already been pointed out, the natural position of Karlstad, the richness of its hinterland in raw materials, its good communications, and its good harbour all make for such a development.

Advantages of this nature are bound to attract industry. This, of course, holds good also of Karlstad, but there has until recently been one drawback to the town's development, namely, the lack of cheap power, in consequence of which sawmills and iron works were established anywhere in Värmland, where waterfalls supplied the needed power, until the province was fairly dotted with mills and foundries. Only since the perfecting of motor technique and, above all, since electric power transmission became possible, has that essential, economical motive power, been available also for Karlstad.



Karlstad. Shipyard and Slip for Vessels up to 500 tons D.W.



Left: The Berg Canal at Trollhattan. Right: The Great Power Channel. Between the two, the New Power Channel, formerly part of the Old Canal.

The Port of Karlstad, Sweden—continued.

In 1906 the town built an electric power station and has since contracted for additional power from Dejefors and bought several waterfalls, whereby the town now disposes over some 4,000 horse power. Lately, connection has also been made with the power station at Trollhättan, whereby the town has access to a practically unlimited power supply at cheap rates.

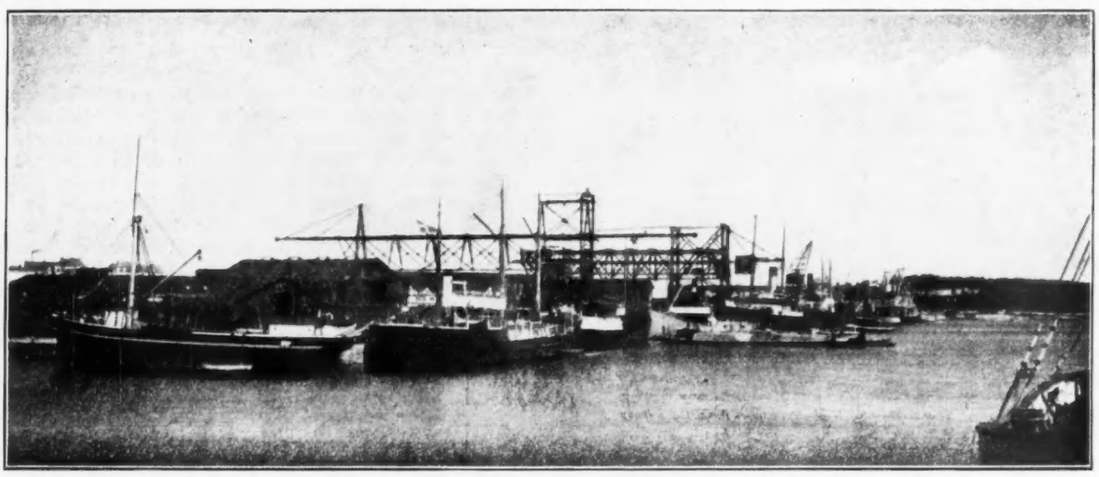
In consequence, Karlstad has now grown into a town of no little industrial importance, having about sixty industrial establishments within its boundaries, not counting minor industries, the building industry or artisans' shops. These various industries employ approximately 1,800 workers. The total value of their production in 1925 amounted to 16.7 mill. kronor.

The mechanical works constitute the most important industrial branch, employing aggregately about 600 workers. Largest amongst them is Karlstad Mekaniska Verkstad, celebrated for its water turbines and paper and pulpmill machinery.

Next in importance are the woodgoods industries, represented all told by nine plants, employing over 300 workers.

There are also seven textile factories, with some 400 workers, as well as glassworks, paper-goods factories, printing offices, bakeries, breweries, dairy and other industries for articles of food and consumption, tannery, chemico-technical factories, etc.

In the hinterland of Karlstad, which practically comprises the whole basin of the Klara River, a number of other large industries, based principally on the supply of wood and iron, are found.



Karlstad. Outer Harbour.

The ore belt ("bergslag") of Värmland has been known since olden times for its production of superior iron ore. The first in rank is the Persberg mine field. Others worthy of mention are the Langban field, and the mines of Nordmark and Taberg. These mines have given rise to a flourishing iron industry. The chief iron and steel works are situated at Hagfors (800 workers) and Munkfors (1,200 workers), in, or quite close to, the valley of the Klara River. The owner of these works, as well as of the iron works of Brattfors, Storfors (400 workers) and Nykroppa (500 workers) is the Uddeholm Company. This company also owns the mines mentioned above and several other mines.

The woodgoods industry of Värmland is now of greater importance than the iron industry. As most of the timber is floated down the Klara River the hinterland of Karlstad may be said to extend as far as the basin of this large river. The total area of this basin is calculated at 1,187,000 hectares, and the aggregate length of its floating ways at 1,200 kilometres. During recent years the timber floated has amounted to approximately 700,000 cubic metres solid measure (7.7 to 7.8 million logs). It is therefore only natural that the lower part of the Klara River valley and the district round about Karlstad should be the principal seat of a large-scale sawmill industry. The next most important sawmill district, the Fryken valley, also has good connections with Karlstad. Hence the environs of Karlstad bear a decided stamp of this industry.

The largest sawmill in the province, and one of the most up-to-date plants in the country, is Skoghall, in the vicinity of Karlstad, owned by the Uddeholm Company. This plant, which gives employment to 1,150 workers, operates, besides saw and planing mills, pulpmills (sulphite and sulphate), wood alcohol and electro-chemical factories.

It stands to reason that the abundance of timber also has led to production of pulp and paper in the lower Klara River valley. Thus the Forshaga Sulphite Company, employing in all 265 workers, in addition to its sulphite factory at Forshaga, operates a pasteboard factory at Ransäter. The Mölnbacka-Trysil Company (950 workers) owns paper and sulphite mill at Deje, paper-mill at Klarafors, and mechanical pulpmill at Mölnbacka. The Dejefors Power and Manufacturing Company (230 workers) owns, in addition to an electric power station, mechanical pulpmill, sawmill, planing mill and joinery factory at Dejefors. And the establishments just mentioned are only a few of their kind to be found in the hinterland of Karlstad.

Communications.

Karlstad has railway communications, firstly, by the State Railway Trunkline Stockholm—Karlstad—Charlottenberg—Oslo, secondly, by the narrow-gauge railways of Karlstad—Deje—Munkfors — Sjögränd — Edebäck — Hagfors — Finnshyttan—Filipstad and Karlstad—Skoghall.

By water Karlstad has connections with Stockholm, Göteborg and intermediate canal and Lake Vänern ports, as well as with English, Dutch, Belgian, French and German ports (Manchester, Liverpool, London, Hull, Rouen, Antwerp, Rotterdam and Hamburg).

Harbour Traffic.

The extent of the traffic in Karlstad harbour is shown by the following figures:—

	No. of Vessels Arriving and Departing.	Total Net Tonnage.
1900	1,849	207,522
1913	3,917	313,321
1926	3,040	342,390

These figures, which do not include vessels under 10 tons net, indicate that traffic has grown considerably since the war, and that the average size of vessel making the port has increased. The number of comparatively large vessels plying between Karlstad and foreign ports is now quite noteworthy, viz., 136 vessels in 1926, totalling 38,508 tons net.

The principal goods discharged are: coal and coke—in 1926, 35,800 tons—grain 8,400 tons, cattle food 2,400 tons, oils 5,100 tons, woodgoods 12,100 cub. m., fertilizers 1,200 tons, table salt, sulphur and chemicals 5,300 tons, asphalt and cement 5,800 tons, stone 4,200 tons, iron ore 1,300 tons, and iron and steel 3,300 tons. The principal goods loaded are: woodgoods, in 1926, 510,000 cub. m., pulp 25,100 tons, paper and pasteboard 12,500 tons, and iron and steel 9,750 tons.

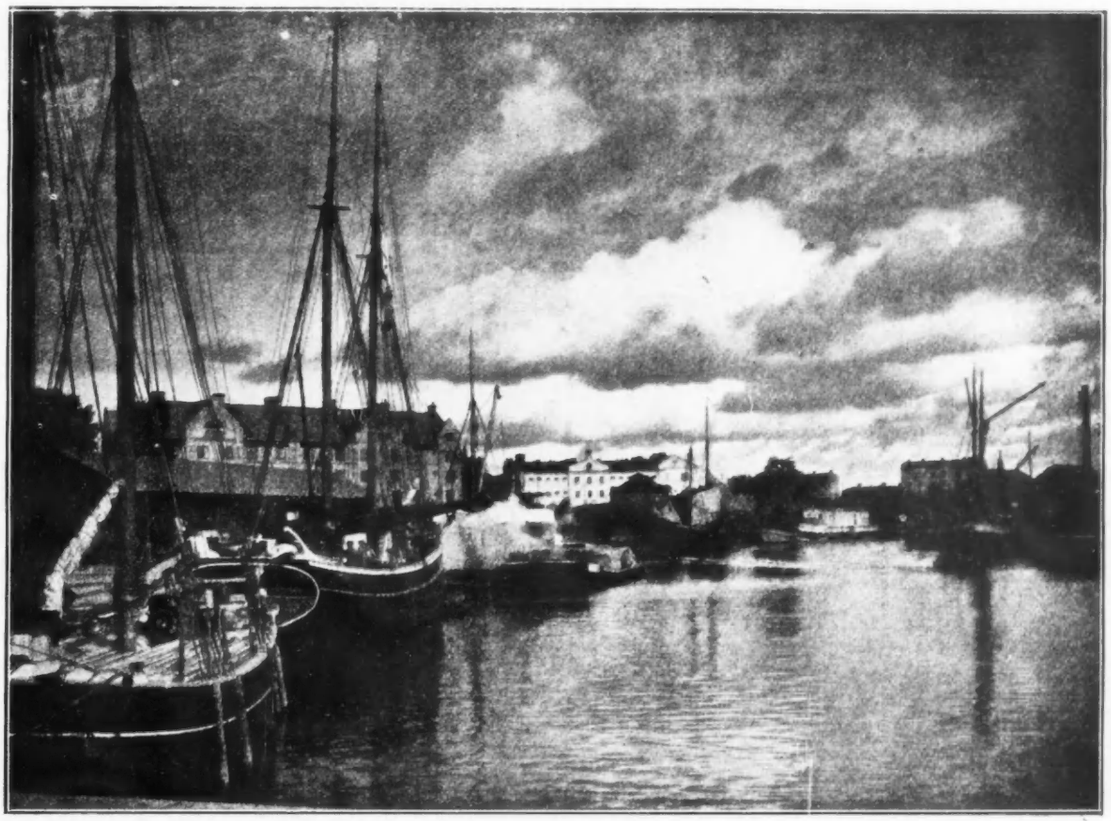
Harbour.

The harbour comprises an inner older basin and an outer recently constructed harbour. In the inner harbour there is a stone quay of about 400 metres' length, laid out with railway sidings and five loading piers. The total quay length for loading and discharging is about 1,400 metres. The depth of water at mean water level is 4.2 metres, at low water three metres. The harbour has three stationary cranes, one with a lifting capacity of 6.5 tons, two with a capacity of 1—1.5 tons.

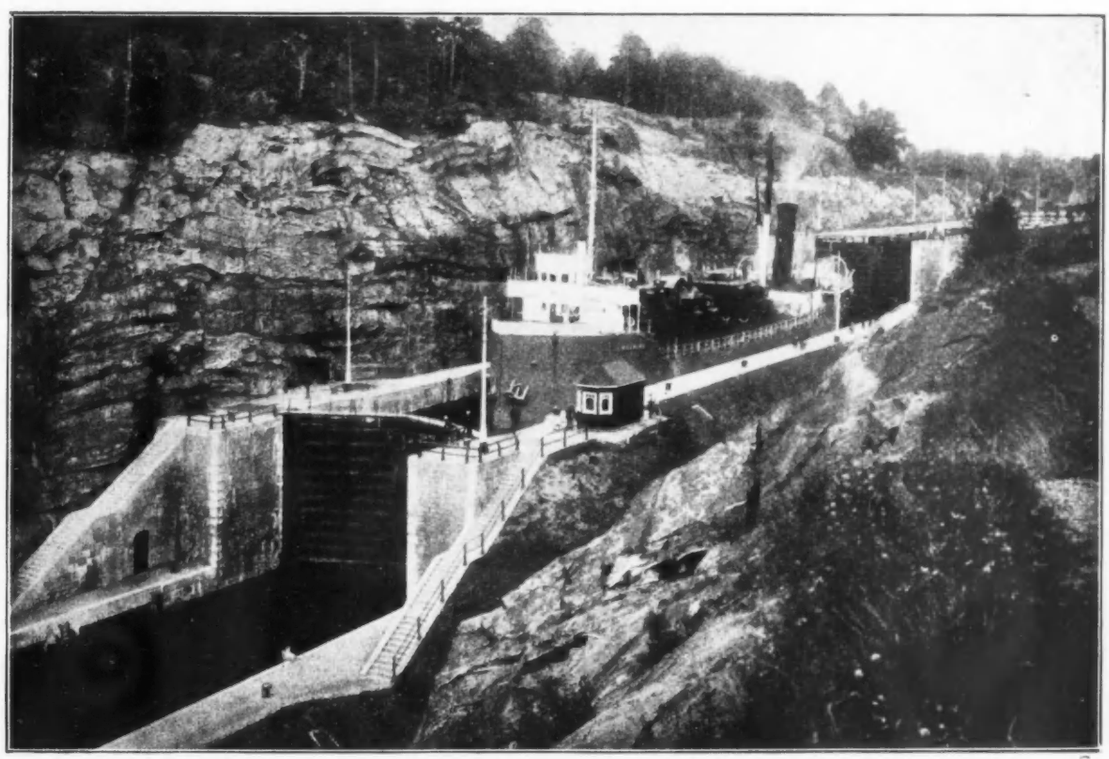
The outer harbour, which has a depth at mean water level of 5.75 metres, at low water of 4.5 metres, has a total quay length of 265 metres. On the quay there are railway sidings from both the State and the Karlstad—Munkfors Railways. The total harbour area is about 430,000 square metres, of which 135,000 square metres are very suitable for storage purposes and may be rented and built on by private concerns. The outer harbour has a movable electric portal crane of five tons and two electric bridge cranes lifting 1.5 and 3.6 tons respectively. Further, there is a fixed electric crane of 15 tons.

An extension of the outer harbour was begun in 1920. Under this scheme dredging operations are in progress, with a view to providing sites for industrial undertakings in direct communication with Lake Vänern, and thereby with the seven seas.

The Port of Karlstad, Sweden.



Karlstad. Inner Harbour.



The Trollhatte Canal. Flight of Locks at Holmen, Trollhattan.

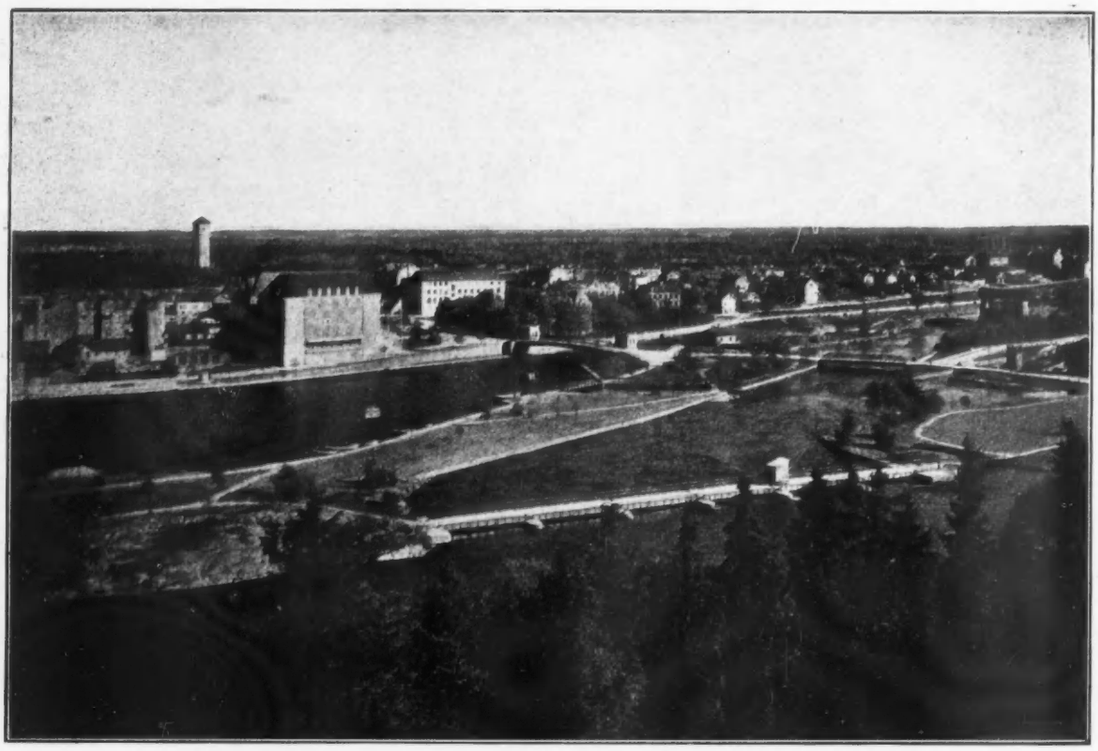
The Port of Karlstad, Sweden—continued.

The Trollhatte Canal.

The first canalisation of the Göta River, connecting Lake Vänern and the Kattegat at Göteborg, was completed in 1800, and in 1845 the locks were reconstructed for vessels drawing up to three metres (10-ft.) The canal as now taken over by the Swedish Government, has been completely reconstructed, and in 1916 was opened for vessels drawing up to four metres (13.5-ft.).

The total distance from Göteborg to Lake Vänern is 84 kilometres, including nine kilometres of canal circumventing the Trollhättan rapids and falls.

The difference in level between Lake Vänern and the sea, about 44 metres, is overcome in the new Trollhätte Canal by means of six locks, each with a fall of six to eight metres. One single lock and one flight of three locks are situated at Trollhättan, one lock at Ström, about 20 kilometres south of Trollhättan, and one lock at Brinkebergskulle, about 10 kilometres north of Trollhättan. The effective length of each lock basin is 90 metres, the width of the gates 13.7 metres and the minimum depth of water on the sill is 5.5 metres at low water.



Trollhattan with the Canal. In the Foreground: Intake of the Great Power Channel.

Thus the locks are constructed for vessels with a draught of five metres, taking an estimated maximum load of about 3,000 tons, corresponding to 1,500 tons net register. Certain stretches of the canal, including the dredged parts of the Göta River, were originally designed with dimensions admitting vessels with a draught of four metres and a maximum loading capacity of 1,470 tons, corresponding to maximum 800 tons net register. The minimum depth at low water is 4.4 metres. The locks are equipped with electric machinery throughout and extremely effective appliances for filling and emptying, so that even the largest vessels are smoothly and conveniently locked in and out in the relatively short time of 15—20 minutes per lock, not including the time taken for the vessel to pass into and out of the lock.

Dimensions.

	Metres.	Feet.
Minimum width at the bottom of excavated canal	24	(82)
Minimum width at bottom of channel in the river	40	(136)
Minimum depth of excavated canal	4.4	(15)
Minimum depth in the river	4.8	(16)
Minimum radius of curvature	500	(1,700)
Minimum free width of the movable bridges ...	30	(100)
Lock dimensions: width of gate-opening	13.7	(47)
min. depth on sills	5.5	(19)
length of lock chamber ...	90	(300)

Maximum size of vessel: 87 x 12.5 x 4-m. (295-ft. x 43-ft. x 14-ft.)
(Larger vessels only by special permission depending on waterlevel)
Highest speed allowed in the river ... ... 10 knots

Regulations.

Regulations applying to navigation on the Trollhätte canal are obtainable free of charge from the canal offices. All information needed is there given concerning semaphores and signal-lights of locks and bridges, berths and passing places, etc. The dues are to be paid at Akersberg, the upper lock at Trollhättan, for vessels going the whole length of the canal.

Shipping on the Trollhatte Canal and Lake Vanern.

In 1920 1.35 million tons of cargo were shipped through the Trollhätte Canal (1.53 million tons in 1913 and 1.6 million tons in 1926). During the same year the total traffic on all canals in the country was approximately 4.1 million tons, and the total railway transportation about 39.1 million tons (42.3 million tons in 1913.). The largest vessel that has passed through the canal measured about 1,400 tons register.

The number of ports on Lake Vänern, as well as Vänersborg, Vargön, Trollhättan and the industrial harbour of Stallbacka, which are situated on the canal itself, have undertaken to give their harbours the same depth as the canal. Of these, the harbours of Karlstad, Kristinehamn, Otterbäcken and Skoghall have already been deepened, while deepening operations at Amal are still in progress. There is no doubt that other ports, as well as the canals connecting other waterways with Lake Vänern, will gradually be adapted to the capacity of the new exit, which makes direct traffic between the ports of Lake Vänern and all European ports possible.

Canals connecting with Lake Vanern.

Lake Vänern is connected with the Baltic through the Göta Canal, which has a depth of 3.0 metres (10-ft.). Other canals link up with the lakes of Dalsland and Värmland, west and north of Lake Vänern, districts rich in pine forests and possessing important wood, timber, pulp and paper industries. These canals are: the Dalsland Canal, length 254 milometres, depth 2.0 metres, 28 locks 21 by 4.2 by 1.8 metres, of which the terminal at Lake Vänern is Köpmannebro, the Säffle Canal, length 91 kilometres, depth 3.0 metres, one lock 32 by 7.75 by 3.0 metres, and two other canals at Karlstad and Filipstad of only local importance, 1.3 to 1.4 metres deep.

Ice Conditions.

The canal is generally closed by ice for 6—8 weeks at the beginning of the year. The canal, as well as the more important Vänern harbours are kept open by icebreakers when the ice is not too thick.

Hull and the Humber.

Purchase of Queen's Dock, etc.

THE position with regard to the proposed purchase by the Hull Corporation of the Queen's Dock, wharves, etc., at Hull from the London and North Eastern Railway Company has been straightened out. The Corporation's petition against the Bill now before Parliament has been withdrawn and the City Council have now approved without qualification a draft agreement for the purchase at a cost of £117,000, this sum to include buildings known as Queen's Dock Chambers, Oriental Buildings, etc. It was reported that as the result of interviews with Mr. Hornsby, Divisional General Manager, L. and N.E. Railway Company at York, and succeeding negotiations, the Railway Company agreed to modifications in the terms. All reference to public buildings was deleted and no restrictions are to be placed on the development by the Hull Corporation or the sale or lease of any part of the water area of the dock. Other points conceded are that 75 per cent. of the remaining water space from Monument Bridge to Lowgate be not used for any other purposes than for the construction of buildings below quay level. One part of the new agreement states that if at any time during the period of five years in which the Company are to complete their share of the filling-in of the dock the Corporation so desire they may give the Railway Company fourteen days' notice in writing to exclude any part of the dock from filling operations. The Corporation is to fill in the machinery pits now used for operating Monument Bridge. The City Council have instructed the Town Clerk to make application to the Ministry of Health for sanction to the borrowing of the purchase money on the agreement being sealed by both parties.

Although the principal people concerned have now smoothed over their difficulties, the scheme will still have opposition to face when it comes before Parliament. The Hull Chamber of Commerce and Shipping at their February meeting confirmed the action of the Parliamentary Committee of the Chamber in continuing their opposition. The Chamber have lodged a petition against the Bill and at the meeting referred to passed a resolution that the Railway Company be asked to give an undertaking that they will proceed promptly with the completion of the south-west "arm" of the King George Dock in order to provide alternative water space to that lost through the suggested filling-in of the Queen's Dock; that the building restrictions placed on the water space of the Queen's Dock be entirely removed; and that alternative accommodation be provided for the trading interests using the Queen's Dock Island.

Mr. C. P. Sherwood remarked that the Committee were very strong in their demand for the completion of the King George Dock so that the water area of the port would not be reduced. The President (Mr. W. Hugh Stephenson, J.P.) said that Sir Alfred Gelder had stated that they had had two guaranteed offers of material for the filling-in of the dock and that therefore the cost would be very little.

Suggested Bridge over the Humber.

It has come somewhat as a surprise that the experts appointed to advise on the question of connecting the two banks of the Humber between Hull and North Lincolnshire by a tunnel or bridge, have reported in favour of a bridge. The report of Sir Douglas Fox and Partners has been received in Hull and copies have been forwarded to members of the Executive Committee in anticipation of an early meeting. It is understood that the estimated cost is in the region of £1,750,000, and that not only will a bridge be much cheaper than a tunnel, but can also be made profitable. The starting point on the north bank will be at Hessle, four miles to the west of the city, and will thus cross at a point where the geological and tidal conditions are most favourable. The Ministry of Transport will be asked to give financial support to the scheme, and there is reason for beliving that the present is a favourable time to make an approach in that direction. The proposal is one which comes under the category of "special utility" schemes for providing work for the unemployed and would obviously be of considerable benefit also to the iron and steel industry. It is the type of plan which is known to be favoured by those responsible for finding work schemes. Whitehall is deeply interested in the proposal, which is eminently utilitarian in character and is a much-needed means of communication between the two great counties, as well as for affording quicker access from Hull to London.

Dock Trust for Hull.

The idea of a Dock Trust for Hull mooted at the annual meeting of the Hull Chamber of Commerce and Shipping is not being allowed to slumber. Important commercial interests are preparing the ground for making a definite move towards taking the docks from the London and North Eastern Railway Company and setting up an independent trust. Mr. W. Minnitt Good, Chairman of the Shipping Committee of the Chamber and author of the proposal, is actively interested in advancing the matter. Enquiries have been made in many different quarters as to how the Hull docks could be taken over. As a result of these inquiries it is found that the establishment of a Port Trust can be brought about either as a result of action by the Board of Trade based upon complaints as to the insufficient and poor accommodation provided by the body for the time being governing the port, or by the traders themselves promoting a Bill for the setting up of a port authority. London and the Tyne are quoted as examples of the two methods. So far as Hull is concerned, it is contended that very definite improvements and extensions are required. The traders have always gathered that want of money prevents the Railway Company doing anything, so that it appears to be the time for the Government to deal with the matter simply and quickly. The position at Hull for obtaining a Port Trust, it is asserted, is much simplified as there can be no opposition on the part of the Railway Company owning the docks to the setting up of such an authority. Section 9 of the North Eastern Railway (Hull Docks) Act, 1893, states:—"The Company shall not oppose any application to Parliament to constitute such Trustees or to confer powers for the purposes aforesaid except as to matters of details." The question of a Dock Trust for Hull was prominently to the fore in 1886 when the old North Eastern Railway Company proposed to buy the estate of the Hull Dock Company, but the suggestion was not supported and the negotiations between the North Eastern and the Dock Company were allowed to proceed with certain guarantees obtained by the Hull Corporation. There are those who think that had a Dock Trust been formed at that time the history of the port of Hull would have been much different from that recorded to-day.

Re-building the Fish Stage and Offices at Hull.

Plans for the re-building of the new fish stage and offices at the St. Andrew's Dock, Hull, have been prepared and the actual work is to be undertaken in the near future. The stage, which had cost over £100,000 was burnt down a few weeks after it had been brought into use, and since then the fish trade has at times felt the want of it very severely. Only recently the discharge of a number of trawlers from the fishing grounds with heavy catches had to be postponed until the following day, owing to the restricted accommodation available. The reconstruction when taken in hand should not be a very long job as a good deal of the under work escaped from damage. An inspection of the new plans shows that the new Billingsgate will be built in three sections of 29 bays each. It is intended that each of the three sections shall be entirely separate so that, should a fire occur in any part it will be possible, it is hoped, to confine it to that particular section. However, it is not expected that there will be much danger from fire as the whole structure will be erected of fire-proof material. The burnt-out stage, it may be recalled, was one continuous structure with offices and stores overhead. This, along with kits and boxes underneath, aided by the strong draught, burned fiercely and it was in this way that a tremendous amount of damage was done. Under the new arrangement there will only be stores overhead, the merchants' offices being located elsewhere. Moreover, it will give improved landing facilities and better accommodation for packing. One feature which should prove of great convenience to the merchants is the provision of combined lock-up office and ice chest, of which there will be 29 in each section. Permanent business premises are to be built on vacant land between the two markets and a postal and telegraph office provided in connection therewith. A new fish merchants' club is also contemplated.

Meeting of the Humber Conservancy Board.

At the monthly meeting of the Humber Conservancy Board approval was given to the payment of £21,897 to the Aire and Calder Navigation as the Board's first contribution towards the cost of the construction of training walls at Trent Falls—a point where the confluence of the rivers Trent and Ouse form the river Humber. The proportion to be borne by the Conservancy is not to exceed £76,000. The training wall in the Trent has been constructed for a distance of 700 yards from its commencement near Island House. The retaining walls to the new sluice at Adingfleet Drain have also been constructed and the Ouse training wall, which will form a component part of the tangential junction, has been completed for a distance of 700 yards eastward of the point opposite Blacktoft

Hull and the Humber—continued.

known as the mile-and-a-half limit. These training walls are in the form of a fish-tail and are expected to have a good influence on the scour of the river and the navigable channel above Hull.

The Humber Conservancy Board at the same meeting concurred in the decision of the Humber Pilots' Cutter Company to obtain tenders for the construction of a new pilot cutter to replace the " W. A. Massey " which is now 35 years old and was recently severely damaged in collision in the Humber. It is also proposed to sell one of the two cutters at present in service. Mr. W. Minnitt Good took exception to the interpretation placed upon the by-laws governing the allocation of appropriated pilots. The Pilotage Committee were informed that the pilots appropriated to the Australian Commonwealth Line and to the Peninsular and Oriental Steam Navigation Company had been also supplied to vessels chartered by these Lines. Acting on the advice of the Board's Solicitor, the Pilotage Committee had decided that the practice should be discontinued and that appropriated pilots should not be supplied to vessels not belonging to these Lines. Mr. Good urged that this was contrary to the spirit of the by-law and that ships on charter were commercially in the ownership of the Lines. He moved and Mr. E. P. Hutchinson seconded an amendment to refer the recommendation back for further consideration. The voting was equal and the Chairman (Mr. J. H. Fisher, J.P.) intimated that he would agree to take the matter back, though he did not hold out any hope of any variation of the decision.

Irish Harbour Matters.

Relaying North Wall Quays.

THE Dublin Port and Docks Board have adopted a report from their Engineer, Mr. Joseph Mallagh, on a letter from the London, Midland and Scottish Railway Company, suggesting that that portion of the North Quays immediately outside their allocated sheds which is maintained by the Board should not be relaid with reinforced concrete, stating that the paving setts constitute a more suitable surface for horse traffic, but that if setts have to be replaced by concrete at a later date, it would cost more than the work could be done for now.

Fitting-out Wharf Nearly Complete.

The Engineer of the Dublin Port and Docks Board reports that the fitting-out wharf, Alexandra Basin, is nearing completion, and that in the interests of navigation it will be necessary to place a red signal light at its southern extremity. Approval for this was obtained from the Irish Lights Commissioners.

Cork Harbour Commissioners.

At the request of an influential deputation of importers, millers and farmers, Cork Harbour Commissioners have decided to reduce the import dues on Indian corn from 1s. 8d. to 1s. per ton. This will afford considerable relief to traders and farmers in the south.

In support of the change it was pointed out by Mr. Aylmer Hall (Messrs. R. and H. Hall, Ltd.) that, while during 1928 the total imports of Indian corn into the Irish Free State amounted to 381,494 tons, 125,404 tons passed through the port of Cork. In 1929, however, the quantity imported fell by 27,519 tons and virtually the whole of that deficit had been borne by the port of Cork. It was further contended that the high import dues on Indian corn were causing a diversion of trade to other ports, notably Belfast.

It is stated that the change will result in a loss of £5,000 in the revenue of the Board.

Freight Charges Discussed.

The Cork Harbour Commissioners have declined to associate themselves with the efforts of the City of Cork Steam Packet Co., Ltd., to prevent a reduction in freight charges between the Irish Free State and Great Britain. This decision was reached at a special meeting of the Board which had been called to consider an allegation that the Great Southern Railways Co., contrary to statute, were placing the port of Cork at an undue disadvantage compared with other ports.

The matter was the subject of a lengthy report from the law agent, Mr. J. Murphy, who referred to the three causes of complaint under the following heads:—

(1) That the Railway Company, by running extra trains to Rosslare, are giving an undue preference to that port.

(2) That the Railway Company were refusing to give the Packet Company the benefit of the differential rates hitherto allowed; and

(3) That the Railway Company, by their agents, are actively canvassing in Cork for traffic via Rosslare.

It was alleged that, by their action the Railway Company were diverting traffic from Cork, and thereby depriving the Commissioners of dues which they would receive if the goods were sent through the port of Cork.

Limerick Port Finances.

According to the report of the Limerick Harbour Board, submitted at a meeting of the Board on the 3rd March, Mr. Roycroft presiding, the accounts for the year ending 31st December, 1929, show a credit balance of £15,000 odd, or £1,424 less than in 1928. There was a falling off in dues of £1,159. The number of cattle shipped from Limerick was 9,184 head, a decrease of 1,694, while butter exports were 233 tons less than in 1928. The reduction in cattle shipments, said the chairman, was due to want of demand across Channel, due to the long spell of drought. The decrease in butter exports was probably due to the fact that it was sold in London and sent by a shorter route.

The report also showed a decrease in the export of flour. Coal imports in 1929 were 114,000 tons, as against 134,000 tons in 1928, while Siemens-Schuckert imported for the Shannon scheme some 16,000 tons. The reduction under normal conditions, it was stated, would be about 10,000 tons.

The Harbour Engineer submitted plans of the proposed dock extension as amended.

It was stated that the cost would be for rail and dock extension about £150,000 to cover compensation for houses to be removed in the course of the rail connection with the Great Southern Railway.

Dublin Port and Docks Board Accounts.

Prosperity continues to mark the working of the port of Dublin. In the report of the Dublin Port and Docks Board for the year 1929, the statement of accounts shows a gross revenue of £206,225 14s. 6d., a total expenditure of £180,196 5s. 4d. and a revenue surplus of £26,027 9s. 2d.

During the year the conversion of Short-term Mortgage Bonds into the Board's 5 per cent. Stock was continued, the amount converted being £18,058 4s. 7d. In addition, Mortgage Bonds to the amount of £6,400 were paid off out of Sinking Fund, the amount of Short-term Bonds being reduced from £98,125 at the end of 1928 to £77,687 at the end of 1929.

The loans outstanding at 31st December, 1929, amounted to £1,139,368 8s. 9d., the balance to the credit of the various sinking funds at that date being £146,443 15s. 8d.

The total register tonnage which entered the Port of Dublin during the year, upon which dues were collected, was 2,366,270 tons, showing an increase of 67,341 tons as compared with 1928.

The income derived from tonnage dues on this tonnage was £78,013 14s. 3d.

Imports and exports from the port were as follows:—

Imports, 1929.

	Foreign Tons.	Cross Channel Tons.	Irish Coasting Tons.
General Goods ...	492,311	516,874	11,920
Coal	—	1,114,927	—
Timber—Loads ...	86,526	4,408	—

Exports, 1929.

	Foreign Tons.	Cross Channel Tons.	Irish Coasting Tons.
General Goods ...	51,621	383,336	14,426
Timber—Loads ...	—	10,356	55

Total goods imported and exported (one load of timber being equal to one ton).

	1928 Tons.		1929 Tons.
Imports	2,125,232	...	2,226,966
Exports	457,449	...	464,794
	2,582,681		2,691,760

Live Stock Exported.

	1929		1928
Cattle	399,460	...	378,160
Sheep	374,167	...	368,475
Pigs	85,479	...	88,750
Horses, etc.	5,390	...	5,631

North-East Coast Notes.

Quick Work at North-East Staiths.

DESPITE complaints from time to time as to delay to shipping on the North-East Coast, instances of quick work are constantly being recorded. The London and North Eastern Railway reported two such cases recently. On February 20th the steamer "Glanton" commenced loading at 7 p.m. and completed at 4.30 the following morning, shipping 4,390 tons of coal in 9½ hours at an average rate of 462.1 tons per hour. On February 22nd the steamer "Westavon" commenced loading at 9.40 a.m. and completed at 6.15 p.m. the same day, shipping 4,390 tons of coal in 8 hours 35 minutes, at an average rate of 504 tons per hour. Another illustration of quick despatch was that of the Cardiff steamer "Porthcawl," which arrived at the Tyne Commissioners' Staiths, Whitehill Point, North Shields, at 4.45 p.m. for bunkers only. She commenced loading at five o'clock and finished at 9.30, having taken in 573 tons. Striking examples of quick loading of coal at Blyth were given in a report on February 26th by the Harbour Commissioners. Among them are:—791 tons in 3½ hours, or 226 tons per hour; 1,462 tons in 6¼ hours, or 240 tons per hour; 4,104 tons in 11¾ hours, or 342 tons per hour; and 2,279 tons in seven hours, or 325 tons per hour.

River Tyne Activities.

At the February meeting of the Tyne Improvement Commissioners Mr. R. S. Dalgliesh referred to the gratifying increase in the coal and coke shipments in January, but said it was less satisfactory to know that there was a fall of about 32,000 tons at Northumberland Dock, indicating that the Northumberland coal trade was not quite so good. The year began with coal and coke shipments almost up to pre-war level. In January they totalled 1,680,966 tons, or an increase of 117,063 tons on the corresponding month last year, but a decrease of 10,241 tons on the figures for January, 1913. In January the bunker coal shipments were 149,983 tons, as compared with 170,687 tons in January last year, a decrease of 20,704 tons. The return of business done at the Commissioners' docks and shipping places shows that during February 115,067 tons of coal and coke were shipped from Northumberland Dock, a decrease of 20 per cent. At Albert Edward Dock merchandise imported totalled 10,390 tons and 1,884 tons exported, a total of 12,274 tons and an increase of 4,058 tons; coal and coke shipments were 60,524 tons, an increase of 3 per cent. Whitehill Point Staiths shipped 117,545 tons of coal and coke, a 3.85 per cent. decrease. The totals gave an increase of 45 per cent. in merchandise and a decrease of 9.79 per cent. in coal and coke.

It was reported that the Unemployment Grants Committee had approved a grant in respect of a new Titan crane for the North Pier, at an estimated cost of £16,000.

A tentative application had been submitted to the Unemployment Grants Committee in respect to an estimated expenditure of £34,500 for the provision of additional cranes, capstans, and hand machines for the Commissioners' docks and staiths.

The Docks Committee recommended that the Commissioners proceed with the provision of these additional facilities for trade and shipping provided that a grant in aid was received.

Wear Developments.

Mr. J. E. Dawson, Chairman of the River Wear Commissioners, speaking at a luncheon on March 5th held in connection with the extension of the Shipping Federation's premises at Sunderland, said the Commissioners were spending £100,000 on another coal staith, and other schemes included a deep-water traffic quay in the river. The port was suffering from a lack of elbow-room, and they wanted more waterway. Plans were prepared for a deep-water quay at the Low Quay, giving a quay 600-ft. long, with a depth of water which would take almost any ship. It would be a great asset to the port. They could not, he said, get business until they got facilities for handling it. There was opposition to the quay because it was said it would interrupt business in the harbour. That was not so, because the line of the quay would be set back. He pointed to the advantage of warehouses abutting on High Street, one of the town's main arteries. It was a very good scheme that ought to be supported. In admitting that it would entail a great deal of money to construct, he stressed the fact that the town would gain from increased business and from increasing the rateable value of a portion of the town which now had a low rateable value.

The trade return for the Wear for January—the latest issued at the time of writing—showed coal shipments totalling 463,351 tons, a decrease of 1 per cent. compared with the same month of 1929. There was also a marked decrease in coke, the two together representing 2.65 per cent. decrease.

Blyth Making Records.

At the annual meeting of the Blyth Harbour Commission Mr. Ridley Warham was re-elected Chairman and Mr. R. M. Sutton, Deputy Chairman. The Chairman of the Finance Committee (Mr. T. E. Forster) submitted the annual accounts, which showed that the Commissioners' financial position was very satisfactory and had been still further improved by the record shipments during 1929. The total amount standing at capital account is now £1,324,000, but the outstanding loans were now only £304,000, which represents a very low indebtedness as compared with the capital expenditure.

The Chairman said that 1929 had proved a record in the history of the harbour. The number of coal-laden ships clearing outwards was 3,506, and, including ships taking part cargo, fishing vessels, or trading vessels taking bunkers only, the total number was 4,281. The total number of ships entering or leaving the port was 8,771.

A statement was submitted showing the coal figures for January, 1930, as compared with 1929 and 1913, viz.:—1930, 465,178 tons; 1929, 440,356 tons; 1913, 371,381 tons—showing an increase of 25 per cent. on 1913 and 6 per cent. on 1929.

It was also reported that during the week ended February 15th, 1930, the total shipments were 124,995 tons, which established a new record for any one week, and on Friday, February 14th, 25,573 tons were shipped, a record for any one day.

Tees-side Project.

An important project for the reclamation of the Tees foreshore on the North Bank is to be undertaken immediately by the Tees Conservancy Commission, and forms part of a plan to develop the river industrially. The scheme will cost £300,857, of which the Government will contribute £120,000, spread over 15 years. The work will take five years to complete, and 1,000 men will be employed for the first 18 months and 150 thereafter. An area of 267½ acres has been scheduled for reclamation, and this area, served by road and railway as well as having an extensive river frontage, will provide an ideal site for new works and industries.

An interesting statement was made by Mr. Malcolm Dillon, Chairman of Seaham Harbour Dock Company, at the annual meeting. He stated that "When the extension of the dock was first contemplated the Government were anxious to encourage work of the kind, so as to employ labour, and we received a grant from the Unemployment Grants Committee of £7,500 towards the expenditure. The Inland Revenue authorities subsequently claimed income-tax on this sum, on the ground that it was income and subject to income-tax. The Local Commissioners upheld the Inspector of Taxes, but we have instituted the necessary steps to take the case into the High Court, and are advised by eminent counsel that we ought to succeed."

Personalia.

Alderman J. G. McIlvenna, of Chirton Hall, North Shields, a well-known consulting marine engineer of Wallsend, died during February. For some years he was general manager for Messrs. H. F. Edwards and Son, at High Shields, and later was identified with the Tyne Pontoon Company. He was a former Mayor of Wallsend.

A North Country veteran passed away in the person of Mr. George Milne, of Monkseaton. He was formerly superintendent engineer to the Stag Line of steamers, North Shields. He was 90 years old when he died.

A familiar figure in Northern shipping circles was Mr. Albert Edward Kightly, of Newcastle, who died at the end of February. He was a partner in the firm of Messrs. Gracie and Co., Newcastle.

H.M. Eastern African Dependencies' Trade and Information Office.

According to a report received by H.M. Eastern African Dependencies' Trade and Information Office in London, Coffee planters in Kenya Colony consider the outlook for 1930 extraordinarily good, and, given average rain, the next crop should show an enormous advance in quantity.

For the first time in the history of Kenya a full shipment of grain has been arranged by charter party, the terms of which provide for the shipment of 6,000 tons of wheat and maize from Mombasa in the middle of February. The destination is the United Kingdom, and the rate is a few shillings per ton below existing conference freight. A very satisfactory report on the milling qualities of new Kenya wheat has just been received from England.

Bombay Port Trust.

At a meeting of the Trustees of the Port of Bombay, held on 11th February, 1930, the following were the main items of business disposed of:—

A revised estimate of Rs.4,02,900 was sanctioned, subject to the sanction of Government, for the new 1,000-ft. shed at Grain Depot.

Consequent on the recent erection of a number of new storage sheds at Grain Depot to meet the increased demand for accommodation, the Board considered the question of the ground rents necessary to cover the capital and maintenance charges. The rates approved from 1st April, 1930, are the same as those in force except that the monthly tenancy rates for grain and seeds occupations will be 6 annas per square yard per month in respect to new lettings or transfers, equal to Rs.4-8-0 per square yard per annum in place of the existing rate of Rs.4-2-0. The yearly tenancy rates of Rs.4-2-0 per square yard for grain and seeds and Rs.5 for other occupations will remain unchanged.

For some time past the Trustees have had under consideration proposals for accelerating the rate of discharge of bulk petrol and kerosene at Pir Pao in view of the steady increase in imports of petrol, the anticipated future expansion in volume and the improvement in the discharge capacity of modern oil-tankers. A detailed scheme prepared by the Chief Engineer was considered and it was decided to proceed immediately with the first stage of this scheme at an estimated cost of Rs.86,510. This provides for replacement of the existing 8-in. pipe between the pump house and the pier head by a 10-in. pipe and provision of an additional turbine and centrifugal pump and the substitution of a 5-in. steam pipe between the boiler house and the pier head. These improvements will increase the discharge capacity from 320 to 350 tons per hour in the case of kerosene and from 134 to 150 tons per hour in the case of petrol. The remaining two stages of the complete scheme, which is estimated to cost in all Rs.10.60 lakhs, will be taken in hand as the necessity arises. They involve substitution of a 12-in. pipe line for the present 8-in. line from the pier head to the installations, provision of an additional steam turbine and centrifugal pump and three additional boilers with staging. It is calculated that the complete scheme, when brought into effect, will increase the maximum pumping capacity to 530 tons per hour in the case of kerosene and 290 tons in the case of petrol and will also enable simultaneous dicharge of petrol and kerosene to be effected at a rate of 400 tons per hour.

At a meeting of the Trustees of the Port of Bombay held on February 25th, 1930, the following were the main items of business disposed of:—

A tender for 250 tons Swastika cement was placed with Messrs. Shapurji Pallonji & Co., and the annual contract for the supply of labour, etc., for loading, unloading, and bunkering Port Trust coal during 1930-31 was placed with Messrs. Hadhavlal & Co., the lowest tenderer.

An amendment of the docks and bunders scales of rates was approved to provide for the levy of reduced wharfage at the rate of Rs.2/- per ton on acids imported in solid form.

The Board considered a reference from the Government in connection with a Draft Convention adopted by the International Labour Conference held at Geneva in 1929 concerning the marking of the weight on heavy packages transported by vessels, with a view to lessening the risk of accident to dock workers. It was decided to inform the Government that the Trustees see no objection to ratification of the Draft Convention and, in reply to the specific questions raised, (a) the Board agree that provision should be made for the approximate weight to be marked in exceptional cases where it is difficult to determine the exact weight, and (b) the obligation for seeing the weight marked should rest with the consignor or his agent.

The Board accepted an offer of Rs.12,000 from the Government for the purchase of the motor lanch "Lorna," which is now surplus to Port Trust requirements and is wanted for use of the Principal Officer, Mercantile Marine Department, Bombay District.

The Board placed on record their appreciation of the prompt and effective action taken by certain officers and staff of the Dy. Conservator's Department in dealing with a fire on the night of February 1st on board a country vessel in the harbour laden with coir rope and yarn. All efforts to extinguish the fire having proved ineffective, the vessel, while still ablaze and drifting, was kept clear of other shipping by the Port Trust vessels in attendance until she could be submerged and the risk of a serious conflagration was thereby averted.

The Junior Institution of Engineers.

A paper prepared by Lt.-Col. J. Hartley, M.Inst.C.E., of Chile, and read by Mr. P. C. Dewhurst, M.I.Mech.E., before the Junior Institution of Engineers and in the presence of His Excellency the Chilian Minister and the Chilian Consul, on the 7th March, gave an exhaustive summary of the geographical and economic features of the country with special reference to engineering activities, past, present and to come.

The national revenue being not more than about 25 million pounds, there was not much left for public works after the other departments had been provided for, loans had been raised for improvements in communications, harbours, etc., and had all been honoured. The present government had embarked on a bolder scheme, a plan of public works to be undertaken over five years at a cost of £40,000,000.

In reviewing the Ports of the country, the principal, Valparaiso, was the oldest and one of the worst sited; much work had been done, notably the great breakwater built by Messrs. S. Pearson and Son, 3,300-ft. long, of which 2,000-ft. was built in water varying in depth from 180—200-ft. The author put forward a suggestion for a floating breakwater instead of continuing the fixed structures. The characteristics of other ports, Talcahuano, Antofagasta, Iquique, San Antonia, were described and the fact that the increasing mercantile marine of Chile would shortly necessitate the provision of further dry-docking facilities would have to be faced.

In reviewing the railways of the country, the cost and difficulty of construction due to the extremely rugged nature of the country was noted and the devious route which had to be followed to overcome these difficulties; thus Santiago and Valparaiso, the two main cities, are joined by a modern up-to-date electric railway of 5-ft. 6-in. gauge which goes by easy grades up to the 2,500-ft. summit and is 116 miles in length. The Government was now spending a large sum of money in making good the missing links in the road connecting the two cities, which would be only 80 miles long when completed whereon a motor car would do the trip in two hours as against three hours by train. Several projected new lines were noted including a tube railway under the Avenida Delicias, the main broadway of Santiago, to be $2\frac{3}{4}$ miles long.

Inland water transport was being developed in the South and a special department formed to work out the establishment of a service of flat-bottomed boats to connect all the outlying villages of the South which can be reached by water and thus act as auxiliary transport to the railway.

The problem of roads was considered and the necessity for expensive bridging of the numerous rivers and streams whose proportions varied greatly with the season, referred to.

Water supply, drainage and irrigation were considered, the latter being a special need of the country, the biggest job at present in hand being the formation of the Maule Lake situate 7,000-ft. above sea level and having an area of 25 square miles which would irrigate some 650 square miles of country.

With regard to industries, a new steel works commenced at the Port of Corrall would cost $1\frac{1}{2}$ millions sterling and employ electric blast furnaces of 50,000 tons capacity each; the electric power being obtained from the falls at Huilo-huilo. The nitrate industry was being consolidated into fewer hands and other factors had tended to bring down costs, but much had still to be done. Coppper mining, formerly one of the principal minor industries, was now confined to three large mines, and Chile to-day is the second largest producer of copper. Chile is the only South American country producing coal, and most of that mined was found under the sea bed. Iron was present in enormous beds. Petroleum is being assiduously sought for in the extreme South. Silver and gold were profitably mined. Marble had just recently been found at Cambridge Island; indeed, it was considered to be composed of practically pure marble equal or superior to the best Carrera marble, and a company had been formed to work it.

His Excellency Don Antonio Huneous, the Chilian Minister, in expressing his pleasure than an English Technical Engineering Institution should display so much interest in the resources of his country, assured the members that the work which British Engineers had done in developing the resources of the country was ever present to the mind of the Chilian, and that British goods were always very welcome. He hoped that in the big developments now taking place still more opportunities for the employment of British engineering and other products would be found and that British capital would be just as welcome as it had ever been.

Wharf Walls in Tidal Waters.

WHARVES AND QUAYS are generally the terms used to designate structures built along the shore or bank of a river or estuary for the purpose of unloading and loading ships.

They may be constructed either with a sheet-piled face with solid filling, or built with walls of mass concrete with filling behind; while there is the modern type of wharf wall built of reinforced concrete and of special design, all three types acting as retaining walls.

Walls built to retain water or earth are known as retaining walls and are classified as follows:—Those construtced to support (1) pressure of water are called dams, (2) earth in equilibrium behind them are termed revetment walls, and wharf walls or quay walls where they have water on the outer face. Quay wall is a term usually applied to those walls constructed in a dock system or basin.

The present article is intended to deal with that special class of revetment or retaining walls which support earth behind them and have water at certain periods on the front—in other words, wharf walls in tidal waters.

Types of Wharf Walls.

Since the earliest times many and varied have been the types of wharf walls, principally due to the most suitable materials for construction found at hand, the nature of the site, and foundations.

The simplest form of wall of modern times is the camp-sheeted wall, which can be used for many varied purposes and in a great variety of situations where only a comparatively shallow depth of water is to be dealt with. This form of wharf can be composed of timber, steel, or concrete.

Latterly, reinforced concrete has added many more types and forms of construction for wharf walls.

The following are the main types of wharf walls which are suitable for the construction of wharves in waters from the shallowest to the greatest depth:—

Campsheeting—timber, steel, or concrete.
Gravity walls—masonry or concrete.
Reinforced concrete walls.
Piled wharves.

It will be noticed that no mention is made in the list of:—

Walls built on piled foundations;
Monolith and caisson walls.

These, strictly speaking, are foundations upon which gravity walls are built, and as such will be dealt with under foundations.

In addition to the types of wall enumerated, there is that type of wharf which is known as a false quay. In this type piling of timber or concrete plays a prominent part.

A false quay may be built out from and above a pitched bank or in front of a wall already in existence, and there are again special types of reinforced concrete false quays.

Examples of Wharf Walls: Campsheeted Walls.

The simplest form of campsheeted wall is that constructed with horizontal planking, the wall depending for stability upon the transverse strength of the main piles along the frontage and the land or "king" piles at the back.

Instead of horizontal planking or sheeting, the sheeting is often composed of driven piles 12-in. by 6-in. in section, with main piles, walings, and capping, and is stronger in a similar situation.

The life of timber campsheeted walls is, of course, limited; the timber being alternately wet and dry is therefore subjected to the worst possible conditions. Now that other materials of a more permanent character are readily obtainable, such wharves are only met with where a long life is not an essential condition.

Fig. No. 1 (a) shows a wharf wall constructed of pre-cast reinforced concrete sheet piles. Fig. No. 1 (b) illustrates a

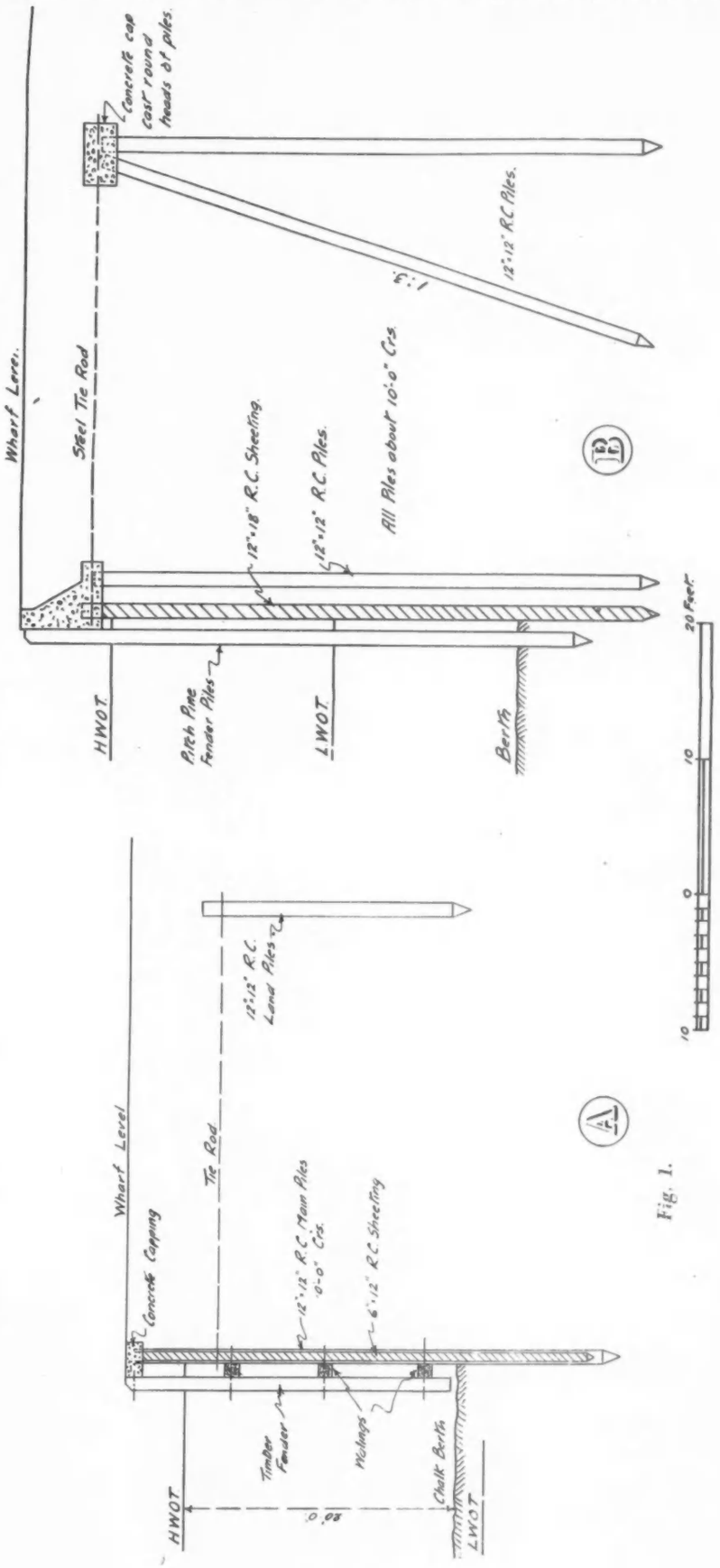


Fig. 1.

Wharf Walls in Tidal Waters—continued.

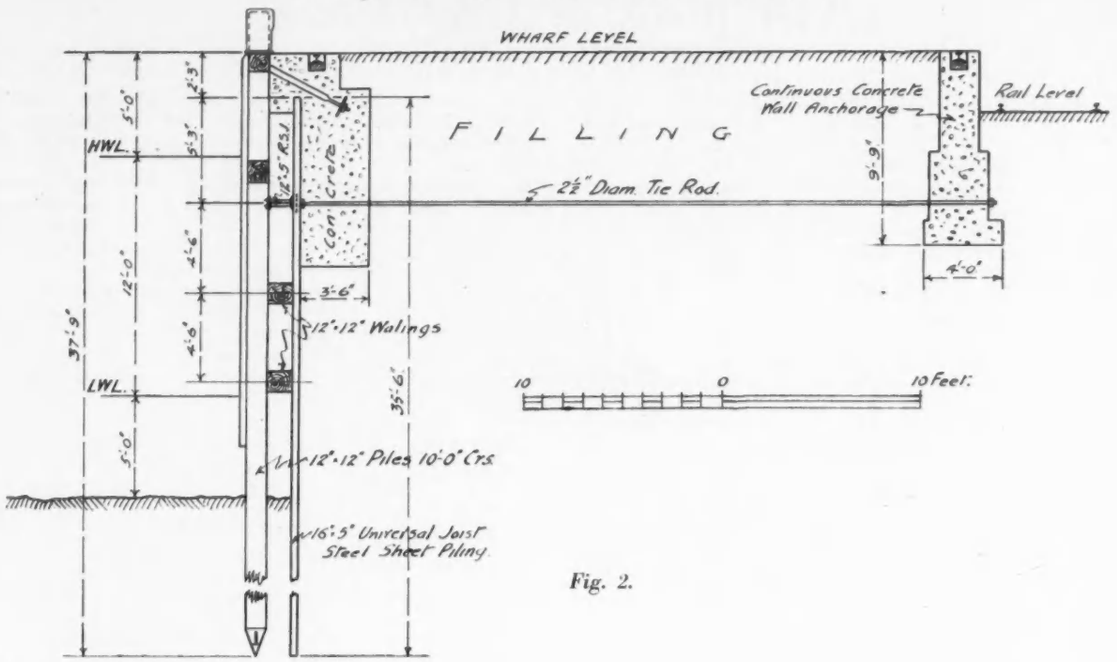


Fig. 2.

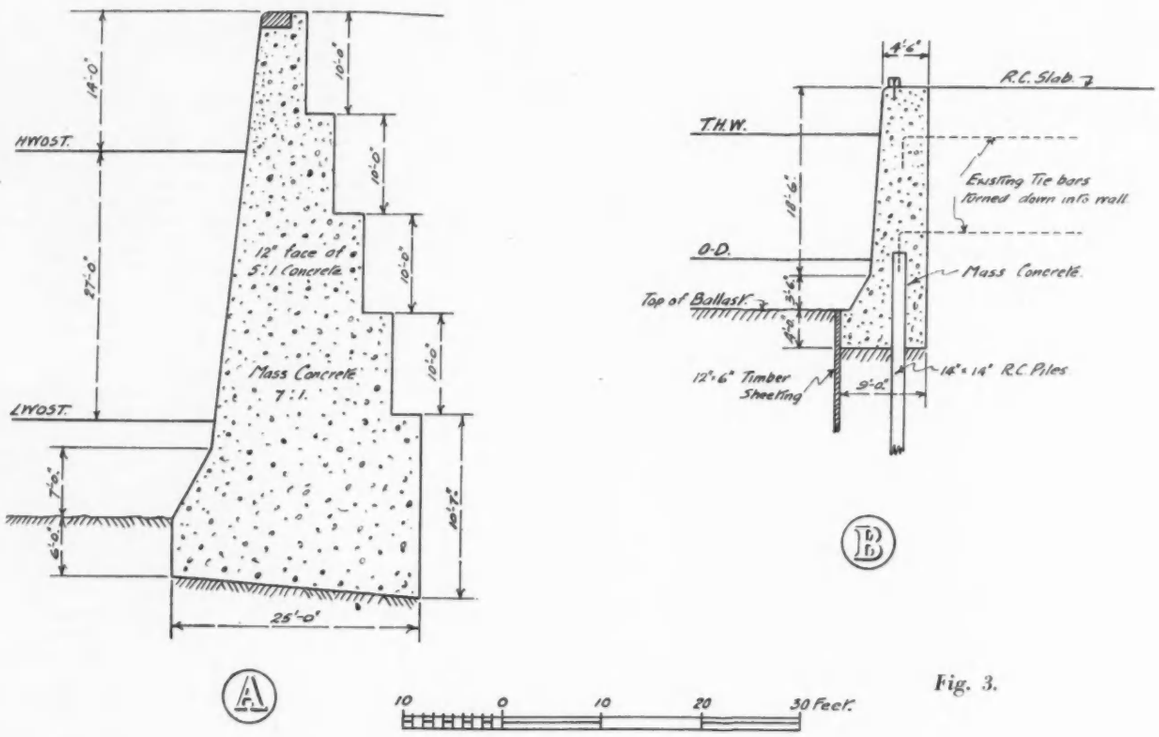


Fig. 3.

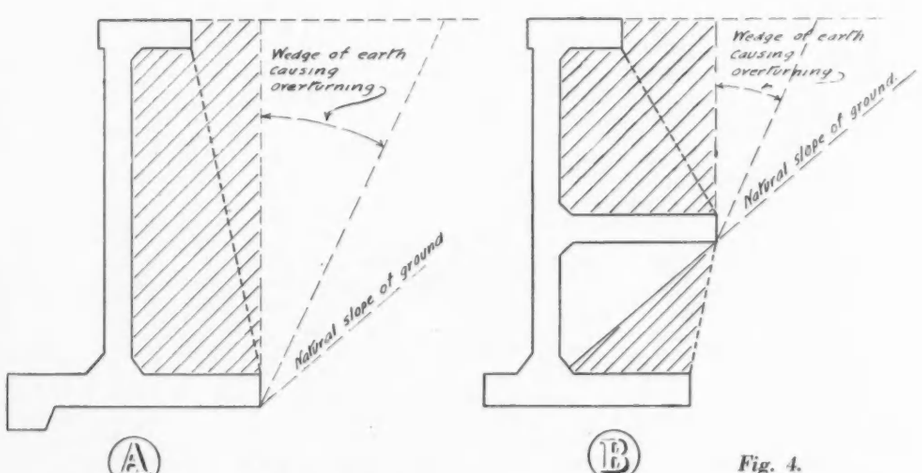


Fig. 4.

DIAGRAMATIC.

Wharf Walls in Tidal Waters—continued.

further type of sheet piled wharf for a deep water berth with a range of tide. The raking piles add considerable strength to the structure.

Steel piling is largely used for camp-sheeted wharf walls and is proving quite satisfactory.

There are several types of proprietary steel piling—the "Universal Joist" piling, marketed by the British Steel Piling Co., Ltd., consists of standard joist piles connected by special rolled steel "clutches."

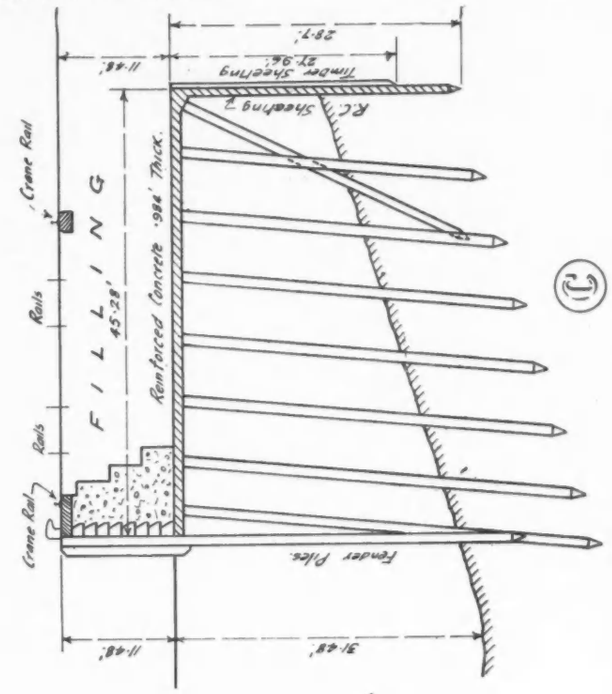
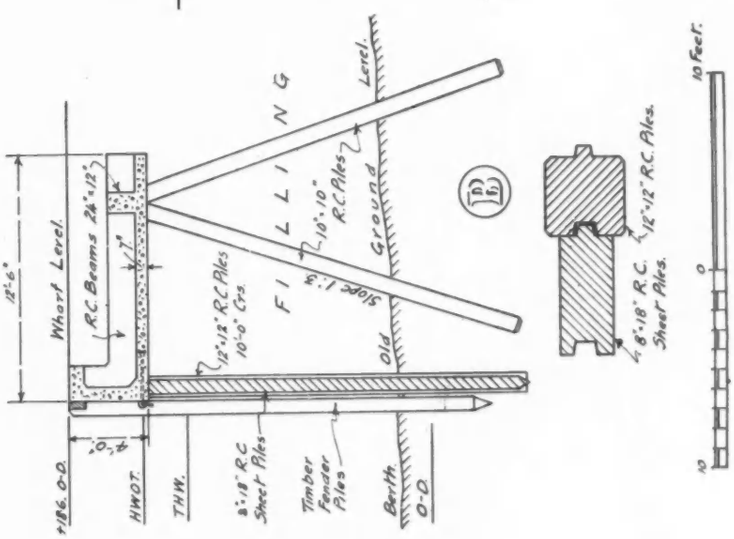
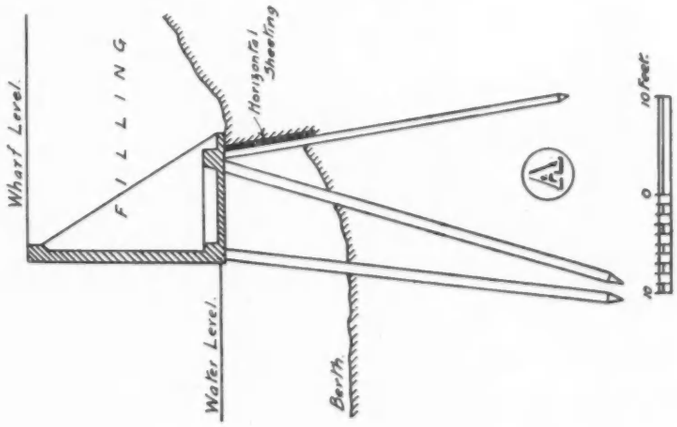


Fig. 5.





Some of the special advantages claimed for this type of steel piling are:—

(a) It drives freely at about one-quarter of the cost of timber driving.
(b) It is water-tight.
(c) It will withstand great pressure, the piles lending each other support.
(d) No shoes to fix or cutting required, the piles being delivered on the job ready for work.
(e) Long life.

Simplex Steel Sheet Piling, marketed by the same firm, is a specially rolled section in which the clutches form part of the pile. This piling is much lighter than the Universal and is intended for much lighter and less important work.

Other types of steel sheet piling are the special trough section piles of the Ransome Vermehr Company, which are claimed to be the strongest British piling in proportion to its weight per square foot, the strength being due to the trough shape with the neutral axis running through the centre of the pile, the material being distributed on either side.

The Side-Groove Steel Piling (Annison's patents) have, like the Simplex piling, an independent locking bar of heavy design, and consequent great tensional strength in the joints of the assembled piles.

It is claimed by the makers that the area covered and the advance of the work per driven pile exceeds all other types; time and cost involved in driving them is therefore comparatively low.

The piles themselves of this type have bulb sides instead of being of joist section as in the "Universal" Joist Steel Piling. Special piles, such as corner pieces, sections, etc., can be readily made.

Fig. No. 2 shows a wharf wall constructed at the Port of Richborough during the Great War. In this instance the steel sheeting is backed by a concrete wall carrying the front rail of a crane track, while the rear crane rail is carried by a concrete wall which also forms an anchorage for the tie-rods. The piling used was the 15-in. by 5-in. "Universal" Joist Steel Sheet piling.

In many instances the steel piling is capped at the top by a timber, steel, or concrete coping, the concrete wall being dispensed with.

Gravity or Solid Walls.

In some situations wharf walls of the gravity type are often met with, particularly where the foundations are good at a reasonable depth. They are more largely used at the present time, however, for the walls of enclosed docks. In tidal waters they almost invariably necessitate the use of cofferdams for their construction.

The following example is taken from Mr. Du Plat-Taylor's book, "Docks, Wharves, and Piers," 1928:—

> "At Heysham, a tidal harbour with a rise of 27-ft., the walls are founded upon sandstone rock. The quay wall in the inner part of the harbour is founded 6-ft. below the harbour bottom at the front, and the bed slopes backwards. The base is 0.43 of the height of the wall measured from the bottom of the toe to the front, but the thickness of the wall diminishes rapidly upwards. The face of the wall has a batter."

The cross-section of this wall is illustrated in Fig. No. 3 (a).

Fig. No. 3 (b) illustrates a gravity wall recently built in the River Thames. 14-in. by 14-in. reinforced concrete piles were first driven at intervals of a few feet, and the mass concrete wall then constructed in a timber cofferdam, the front face of which was afterwards cut off at foreshore level. The foundation was hard Thames ballast. Existing tie-rods were utilised by being turned down in the concrete. Low water in this case leaves the foreshore and wall dry.

Further examples of gravity walls will be given in a later article devoted to this type of wharf wall.

Wharf Walls in Tidal Waters—continued.

Reinforced Concrete Walls.

Reinforced concrete since its introduction some 65 years ago has undergone a marked and rapid development in all its branches, but it is only in recent years that it has been greatly adopted for marine structures.

Numerous modifications and distinct types, varying very considerably from the original idea, have been evolved.

Almost the first type of retaining wall was of the design shown in Fig. No. 4 (a). In this type the lateral pressure of the earth at the back of the vertical panel is counteracted by the weight of the earth above the horizontal back panel and by the vertical reaction of the ground beneath the front panel or toe.

The stiffening diaphragm is in tension and adds considerably to the strength of the wall by anchoring back the upper part of the wall.

This consists of a wide reinforced concrete platform about 1-ft. thick, supported by a number of reinforced concrete piles. The piles are driven on the batter and are 15.75-in. square in the first four rows, 13.78-in. square in the next two rows, and 11.81-in. square in the back row; the main piles are 5.75-ft. apart longitudinally, and between each set of main piles is driven one raking pile to take the thrust of the earth behind the back sheeting piles. The super-structure wall is of masonry.

A wall such as the above is a satisfactory type where the encroachment of a solid wall upon the tideway of a river is inadmissible.

Piled Wharves.

Piled wharves is the term usually applied to those structures built upon piles or cylinders which support some form of decking, the river bank either falling at its natural slope under the structure or retained by a revetment wall or camp-sheeting.

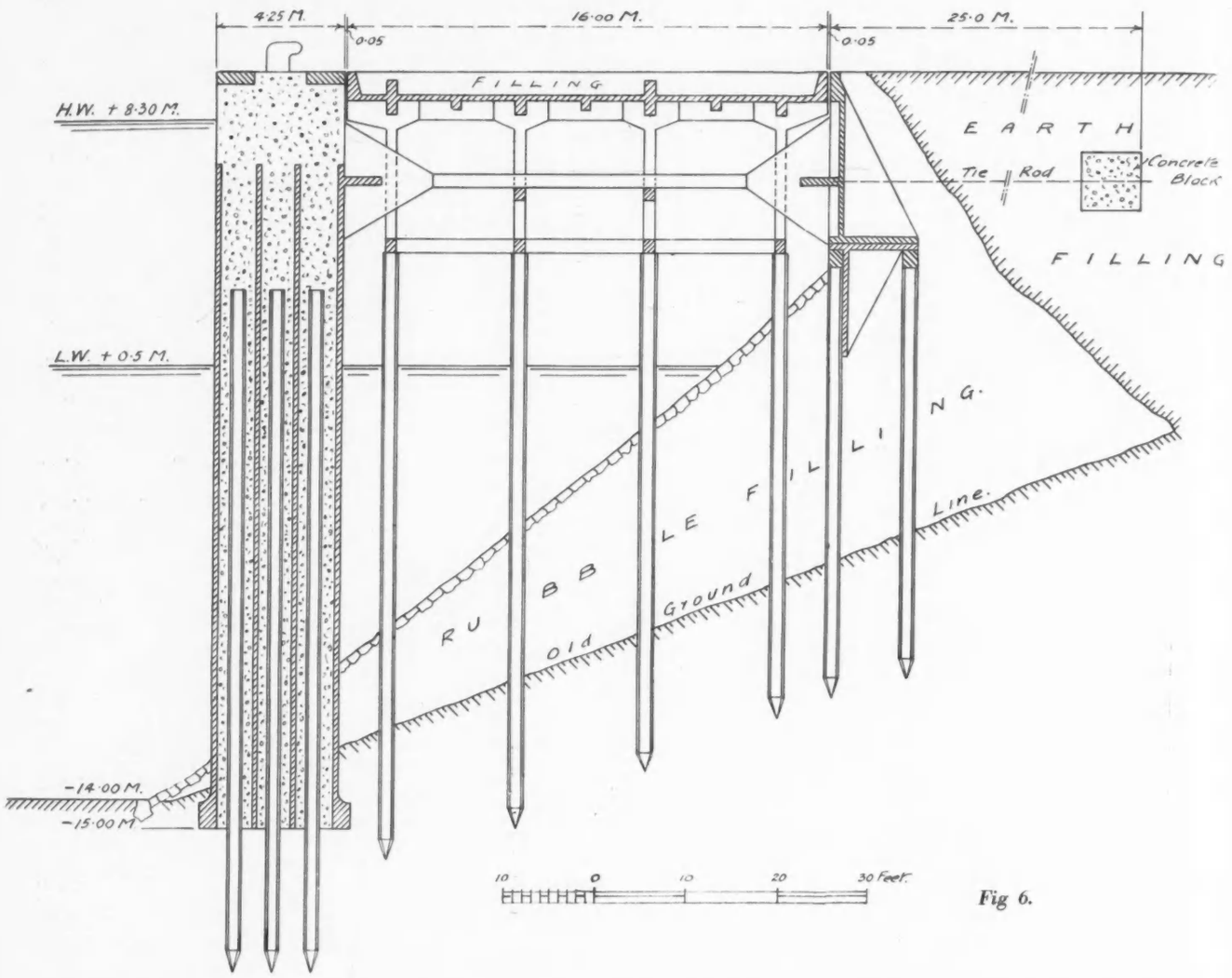


Fig 6.

Modifications of this type of wall are constructed with shelves (Fig. No. 4 (b)) which relieve the earth beneath of pressure and as they are only partially filled with earth standing at its natural slope, the total horizontal thrust is reduced.

This type of wall is not of much use for wharf walls because the pockets void of earth soon fill with water, the lateral pressure of which is unbalanced in walls where low water falls below the toe of the wall.

The next type of wall is shown in Fig. No. 5 (a), in which the angular retaining wall is retained, but resting upon a substructure of reinforced concrete piles and a water-tight sheet piling of reinforced concrete. This wall was actually constructed at Rooshafen, Hamburg, in 1911, by Christiani and Nielsen.

Fig. No. 5 (b) shows a wharf constructed in the River Thames by Messrs. Saxild and Partners in 1924.

In this case the principle of the angular retaining wall is still adhered to, but is of less depth and the sheet piling is driven along the front of the wharf. This sheet piling consisted of reinforced concrete sheeters 8-in. by 18-in., tongued and grooved, with main piles 12-in. by 12-in. at 10-ft. centres.

Fig. No. 5 (c) shows a wharf wall constructed at Ghent in 1922, and is taken from Mr. Du Plat-Taylor's treatise—Docks, Wharves and Piers.

In this type there is no super-structure wall and often no earth filling over the deck.

Although the wall at Ghent and others previously illustrated and described are built upon piles, they are not therefore strictly in the category of piled wharves.

Piled wharves proper are often used in front of existing wharf or quay walls in order to increase the width of the wharf or quay in a cheap manner, or to obtain a greater depth of water; they are then generally termed " False Quays."

In a piled wharf the main piles are usually arranged under the most important loads such as cranes, railway trucks, conveyors, etc., and the decking is supported on transverse beams.

Such wharves can be very cheaply constructed, and form a convenient alternative to the camp-sheeted, gravity, and reinforced concrete walls. Their application, however, is not universal as certain types of ground are unsuitable for their construction, and recourse must be had to the gravity wall, monolith or caisson wall structure.

Fig. No. 6 illustrates a composite wharf—(full details of this will be found in the *Dock and Harbour Authority* for January, 1929)— i.e., constructed with square " cylinders " and reinforced concrete piles and bracing. This wharf consti-

Wharf Walls in Tidal Waters—continued.

tutes the North Quay of the Tidal Basin of the Port of Havre, and was built within the last few years.

In this case, the "cylinders" are separate from the piled wharf and form dolphins and were incorporated in the design, to provide a stiffer and more robust form of construction than would have been obtained with piling, as more effectually resisting the heavy impact stresses due to berthing the large vessels which are accommodated at the quay.

It will be seen that the wharf is essentially composed of three separate units—the dolphins against which the vessels lie, the decking which is a separate structure carried upon vertical piles, and the retaining walls in rear, to the upper one of which the dolphins are braced.

In the River Thames on the north bank from Barking almost to Leigh-on-Sea, the bank is composed of a river wall built upon very treacherous ground, usually peat, below which ballast or chalk is met with only at a considerable depth, the land at the back being marsh land several feet below the level of high water.

The problem of wharf walls constructed here is a difficult one, and there have been several failures.

Much difficulty has been experienced in that the filling deposited at the back of the wall tends to force up the ground on the front of the wharf, thereby reducing the depth of water available for berthing vessels, and the wharves themselves have been forced over out of perpendicular, unless well founded.

Fig. No. 7 shows a piled wharf which has been adopted for such conditions.

The back sheeting retains the earth filling above the slope of the river embankment and the front sheeting driven down to a considerable depth prevents the upheaval mentioned.

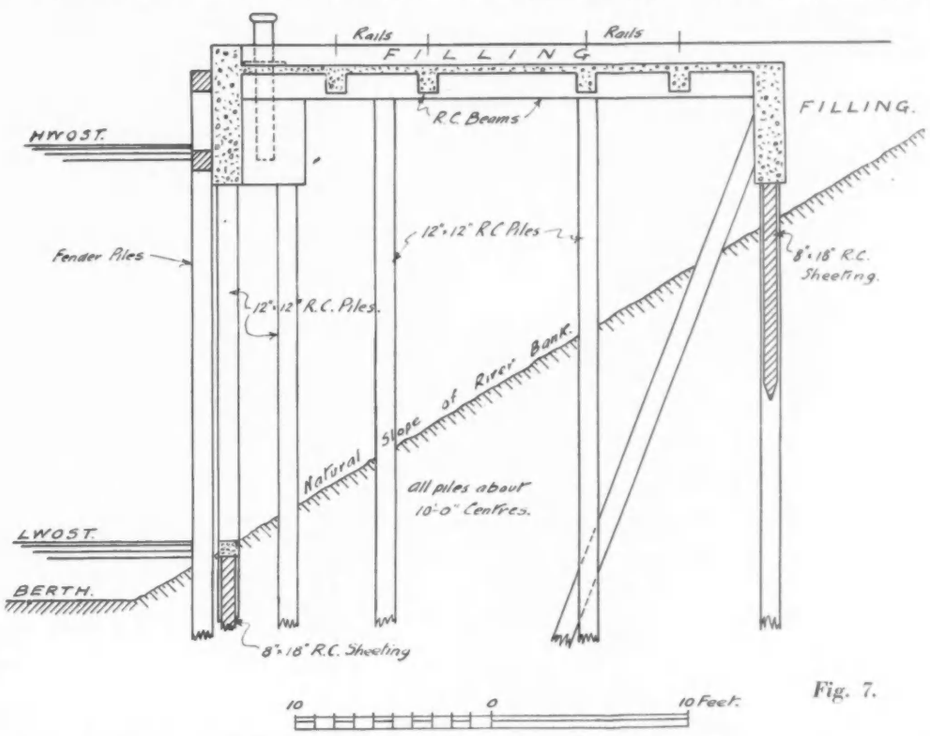


Fig. 7.

Foundations.

The foundations of gravity walls form a most important part of their construction.

The upward resistance of the material under the base of the wall—that is to say, the bearing pressure of the material, will be spoken of in a later article, and it will be seen that it is necessary to fulfil certain conditions in regard to distribution of pressure, direction and magnitude of the resultant force.

The subject of foundations is a vast one, and space will only allow of the following briefest consideration:

Under Some Notes upon the Design of Gravity Walls—the later articles above referred to—will be found some further remarks and a Table of Safe Loads, Angles of Repose and Weights.

With regard to the safe bearing power of various earths, there is difficulty in arriving at a correct estimate. There are many tables of safe bearing pressures of soils, but unfortunately in general they refer to foundations at or near the surface of the ground, and little data as to safe bearing pressures at varying depths appears available.

In the face of these difficulties it appears to be more often the practice, having obtained the type and quality of the strata from borings or other means, to estimate its classification and safe bearing power from some reliable tables, and to modify these values by the use of Rankine's formula, later referred to.

Mr. A. L. Bell has suggested a modification of this formula (Min. Proc. Inst. C.E.; vol. cxcix.) which can be used in this connection.

Clay is a very uncertain material; it varies greatly in texture and consistency, and the slightest variation in the quantity of water in its composition appears to make a vast difference in its behaviour under pressure.

Uncertainty arises in the fact that it is difficult to say in practical work in what classification the clay should be placed, and it is obviously impossible to wait until the wall trenches are opened in order to obtain the safe bearing pressure of the strata at the site, and to then commence designing the wall.

The term Clay, in point of fact, is a classification embracing a very wide series of argillaceous substances, derived from the decay and hydration of aluminous silicates, white when pure but usually mixed with impurities which impart different colours to the clay and quite different characteristics.

It is usually found containing interstitial water, its volume, texture and consistency varying greatly with the quantity thereof. When thoroughly dry pure clay is hard and brittle, and when saturated with water becomes soft and viscuous.

Mr. A. S. E. Ackerman, describing certain of his experiments on the resistance of clay at the Institution of Civil Engineers in 1921 (Min. Proc. Inst. C.E., Vol. ccxiii., p. 144), mentions the astonishing effect on his results of different percentages of water in clay. This point is often lost sight of by designers—that is to say, various strata, not only clays, but when exposed by excavation to the influence of water, become different in character.

Precautions against this possibility are more desirable in the case of walls surrounding excavated docks built inland rather than wharf walls built upon the river banks where the frontage is not subject to an excessive depth of dredging which would expose strata to the influence of water which otherwise would have remained below such influence.

Clays mixed with lime become what is called "Marl," which is of a brittle nature. Mixed with sand the compound is called "Loam" and is more tenacious.

Clays, as will be seen, can be of widely differing characteristics, generally however, it may be said that if properly protected they make good foundations.

A variety of clay, known as Blue Clay, often, however, has the dangerous characteristic of possessing certain planes of cleavage or non-adhesion, often in such a state of greasiness that under favourable conditions the upper layer will slide over the lower with ease.

A Blue Clay foundation has been the cause of several collapses of Dock walls, notably at Southampton, Avonmouth and Calcutta.

Gravel and sand foundations, if of sufficient thickness over a hard substratum, are usually firm and durable if protected from the action of tidal currents.

Wharf Walls in Tidal Waters—continued.

Running sand and sand subjected to the effects of running water are, of course, quite unstable, and foundations must be piled or otherwise carried below the stratum.

Chalk forms a good foundation for the base of wharf walls; and if met with at a reasonable depth below 50-ft. strata, all piles supporting heavy loads should be driven down into it.

Precautions must, however, be taken to prevent sliding of gravity walls upon the surface of the clay, which under the influence of water is liable to become soft and greasy.

Artificial foundations, strictly speaking, are those in which the original strata has been consolidated in some way.

At Vintry House, therefore, the whole site was sheet-piled—"Universal" steel piles of the British Steel Piling Co. were driven into the clay on all four sides, the site being divided to form two separate cofferdams. These effectively sealed the site, and pumping was carried out continuously without in any way affecting the stability of surrounding buildings.

The riverside cofferdam was divided again into three sections in which the deep excavation and construction of the mass concrete river wall proceeded under favourable circumstances. A small pump was all that was necessary to keep the dams dry.

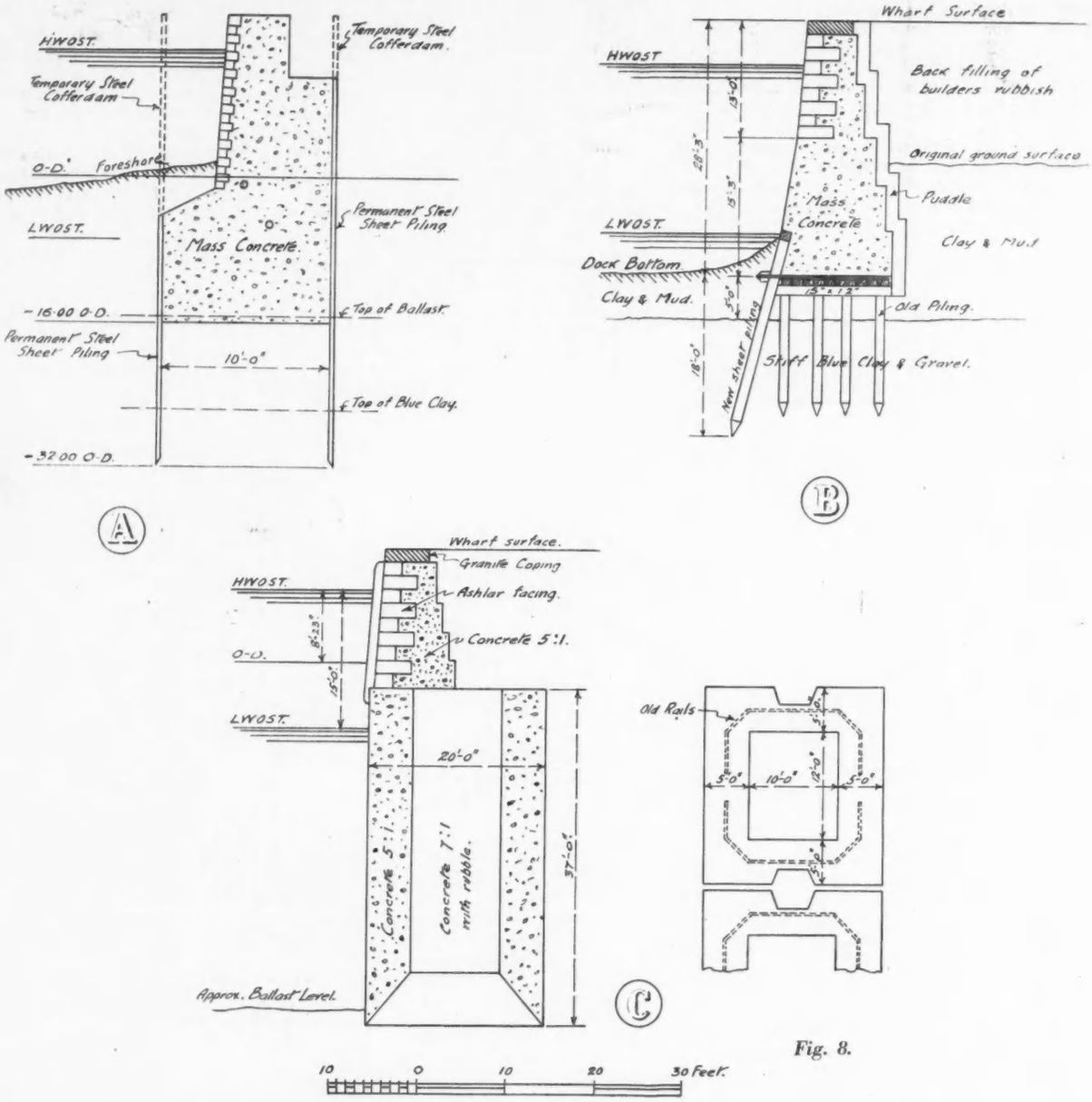


Fig. 8.

In dock and wharf walls the methods most frequently met with are—sheet piling the toe and heel of gravity walls, or by driving piles down beneath the base of the wall itself.

Monoliths and caissons may also be looked upon as forms of artificial foundation as the wharf or dock wall proper is usually in the nature of a superstructure built upon the top of the monoliths or caissons, retaining the earth filling in rear in the usual way. In American and Canadian ports there is the form of construction known as Cribwork.

Walls of the first three types are shown in the Figure No. 8, the first illustration showing a wall recently constructed in the Thames at the new Vintry House, London.

This wall is not one for use as a commercial wharf, but sustains the very considerable weight of the river frontage wall of the new building; its type, however, is one which can be readily used for a wharf of the kind under discussion.

In London of recent years the danger has been forcibly brought to public notice of constructing deep foundations for high buildings without first ensuring that the heavy pumping necessary for such work will not have serious results upon surrounding property.

On completion of the concrete work of the river wall the steel sheet piles were cut off at the top of the concrete toe, the lower portion being left in the ground permanently.

This method of consolidating foundations by steel sheet piling, which also forms the cofferdams in which the walls are built, has immense advantages and is used extensively. A long length of wall on the riverside of Grosvenor Road, Westminster, London, at present being built by the London County Council in conjunction with the new Lambeth Bridge, is being constructed on the same principle.

The second illustration in Figure No. 8 is that of a wharf wall at Limerick in which the ground under the base of the wall is piled. Owing to the obliquity of the resultant pressure on a wharf or dock wall, considerable advantage is gained by the use of raking piles, which in this wall have been used.

The third illustration, Figure No. 8 (c), shows a wharf wall at Newcastle-upon-Tyne, constructed upon monoliths.

The monoliths are rectangular in plan built upon a cast-iorn toe, and were constructed by a process of building and sinking in stages of 9 to 12-ft., and not according to the more modern method of construction of block formation.

The Port of New York.

Latest Data issued by the Bureau of Commerce.

Value of Foreign Commerce.

EXPORTS for November and December, 1929, were $136,372,000 and $133,176,000 respectively, making a total for the calendar year of $1,904,428,000, a figure slightly lower than the estimated total given in our February issue.

Imports amounted to $172,557,000 for November and $157,091,000 for December, making a total for the year of $2,153,396,000.

The exports for November, 1929, fell off 20 per cent. as compared with the same month of 1928, largely on account of decreased shipments of automobiles, apples, manufactured furs, and cotton. Imports for November gained 10 per cent.

The foreign trade of the United States showed a marked slump in the last quarter of 1929 as compared with the previous year, after having made a phenomenal gain in the first six months of the year. While the commerce of the Port of New York reflected this decline, it is noteworthy that the loss of foreign trade during the last quarter of 1929 was less at this port than for the United States as a whole. In October, November, and December, 1929, the value of foreign trade through the Port of New York aggregated approximately $35,000,000 less than for the last quarter of 1928, a drop of 3.5 per cent. The loss during the same period for the United States as a whole was approximately $155,000,000, or 6 per cent.

Grain Exports.

The Port of New York shared in the general decline in grain exports from the North American continent during the month of December, 1929. Exports of all grains of both domestic and Canadian origin through United States ports fell off from 38,628,000 bushels in December, 1928, to 14,719,000 bushels in December, 1929, a loss of 62 per cent. Exports of grain through the Port of New York declined 59 per cent, totalling 5,732,000 bushels in December, 1929, against 13,994,000 bushels in December, 1928.

	December. 1928 Bushels.	1929 Bushels.	Net Change Bushels.	Per Cent.
Through the Port of N.Y.				
Domestic Grain ...	1,726,000	392,000	— 1,334,000	—77.3
Canadian Grain ...	12,268,000	5,340,000	— 6,928,000	—56.5
Total ...	13,994,000	5,732,000	— 8,262,000	—59.0
Through all U.S. Ports.				
Domestic Grain ...	19,090,000	9,138,000	— 9,952,000	—52.0
Canadian Grain ...	19,538,000	5,581,000	—13,957,000	—71.0
Total ...	38,628,000	14,719,000	—23,909,000	—62.0

Commerce at Port Newark.

The volume of general cargo moving into Port Newark during December, 1929, amounted to 6,951 tons, and during January, 1930, to 12,381. The January figure represents a 67 per cent. gain over the 7,409 tons handled in January, 1929.

The quantity of lumber received at Port Newark during the month of January, 1930, also shows a large gain, approximately double the receipts of January, 1929.

January, 1930 ...	34,096,000 board feet
January, 1929 ...	17,118,000 board feet

Port Newark first came to the front as an important terminal for handling lumber in the Port of New York in the year 1923, when 31,000,000 board feet of lumber was handled over its docks. Since that time it has grown steadily and rapidly to a position which saw 500,000,000 board feet move through the port docks in 1929. During this period from 1923 through 1929 approximately 2,000,000,000 board feet of lumber has passed over the Port Newark docks.

This remarkable progress as a lumber terminal may be directly traced to the advantages of an ample area in the rear of the docks for storage purposes, rails alongside steamer for discharge into cars, and a wide dock area for efficient operation of special mechanical equipment for movement away from ships' tackle.

These facilities attracted the attention of the lumber interests, with the result that three of the largest wholesale lumber merchants on the Atlantic coast located their plants at Port Newark. Quick dispach on steamers, easy trucking distance to Manhattan and Brooklyn, fine rail lay-out, and a splendid labour market were important considerations to these Companies in selecting the Port of Newark.

Under average conditions, lumber is discharged at the Port Newark docks at the rate of 700,000 board feet per day of eight hours, and this is taken away from end of ship's tackle as fast as it is placed on the dock. It can be trucked to Lower Manhattan in 30 minutes via the Holland Tubes. Double tracks parallel the dock for 2,000-ft., with two cross-overs and a belt line connecting at either end. This makes for easy and quick movement of cars on and off the dock.

There is in storage at all times more than 100,000,000 board feet of lumber of all sizes and description ready for the retail and wholesale metropolitan market. One can usually find four or five lumber steamers discharging their cargo over the various docks at Port Newark at the same time.

Vessel Movements in Foreign Trade.

Vessel movements in foreign trade in and out of the Port of New York during the month of January, 1930, amounted to 588 clearances and 561 entrances, an increase over January, 1929, of 40 clearances and 27 entrances. The tonnage of vessels in foreign trade also showed gains in January, 1930, over January, 1929.

	January, 1930. No. of Vessels.	Tonnage.	January, 1929. No. of Vessels.	Tonnage.
Entrances ...	561	2,580,943	534	2,437,239
Clearances ...	588	2,719,198	548	2,400,722

Steamship Sailings.

The month of December reflected the usual seasonal decline, particularly in the number of direct foreign sailings on the North Atlantic routes. The cruising season, however, opened up this month, and 13 pleasure-bound vessels left the Port of New York, compared with none in the three previous months.

Direct sailings to the Pacific Coast also showed an increase over previous months. Since the Panama-Pacific Line inaugurated fortnightly sailings with their new vessels, the "California," "Pennsylvania," and "Virginia," passenger traffic via the Canal route has steadily grown. Incidentally, this service, like many others, is operated exclusively from the Port of New York.

New Ship Construction.

The American South African Line's new motor ship, "City of New York," sailed from New York on February 1st on her maiden voyage to South African ports. This vessel is the first in a fleet of new vessels for this trade. Plans have already been completed for the construction of an additional vessel, and further tonnage will be added as trade warrants.

New York State Barge Canal.

The Inland Waterways Transportation Company are building a sister-ship to the "Empire State," which was launched and operated last year between the Atlantic seaboard and the Great Lakes ports via the State Barge Canal. The new vessel will be named the "Buckeye State," and will have a capacity of 2,000 tons. It will have a speed of 10½ knots, 2½ knots faster than the "Empire State," and will be able to reach Cleveland in 4½ days and Chicago in seven days. It is expected to be ready for operation in May.

The Barge Canal terminals in Brooklyn and Queens showed an increase of 187,000 tons handled in 1929. The gain was all registered at the Gowanus and Astoria terminals, the Greenpoint, Flushing, and Long Island City terminals showing declines.

Warehouses.

In its report on merchandise warehouse space occupied in the Port of New York District at the end of December, 1929, the United States Department of Commerce shows the entire district with an occupancy of 84.3 per cent., Brooklyn 86.2 per cent., Manhattan 78.7 per cent., and near-by New Jersey and all other sections of the Port District 80.4 per cent. The figure for the United States as a whole is 76.2 per cent.

Through the courtesy of the New York Cotton Exchange, the Silk Association of America, the New York Coffee and Sugar Exchange, and the New York Cocoa Exchange, the Bureau of Commerce presents a comparative statement of stocks in storage at the end of January, 1930, of commodities handled by these Exchanges:—

	January, 1930.	January, 1929.
Cotton (square bales) ...	92,002	70,637
Silk (bales) ...	76,264	49,943
Sugar (bags) ...	2,390,992	588,681
Cocoa (bags) ...	401,899*	262,796*
Coffee (bags) ...	473,806	623,483

*These figures include estimated 75,000 bags in unlicensed warehouses.

The Port of New York—continued.

The year 1930 will see two important additions to the warehouse space in the Port of New York District, when the new terminal warehouses of the Delaware, Lackawanna and Western Railroad and the Pennsylvania Dock and Warehouse Company (a subsidiary of the Pennsylvania Railroad) are opened.

The D.L. & W. warehouse is located between 16th and 18th and Henderson and Jersey Streets, Jersey City, and was opened last month. It has a gross floor area, exclusive of delivery platform, of 1,060,050 sq. ft. The net space available for assembling, light manufacturing, and general storage purposes is 710,233 sq. ft. The building contains eight stories and a basement and is served by 14 general freight elevators, two automobile elevators, and three passenger elevators.

The project of the Pennsylvania Dock and Warehouse Company, also located in Jersey City, includes three warehouse buildings, the first of which is now under construction and will contain a total of 6,000,000 cubic feet, 4,000,000 of which will be devoted to cold storage. Two more buildings are expected to be completed during 1930, giving a total capacity of 27,000,000 cubic feet for the entire unit. The space outside of cold storage may be used either for storage or light manufacturing. The three warehouse buildings will be eight stories high, constructed of reinforced concrete, with floor loads of from 200-lb. to 300-lb. per square foot. The terminal will have a direct connection with the tracks of the Pennsylvania Railroad, the upper floors to be served by twelve freight elevators.

Belfast Harbour Notes.

Imports and Exports.

THE remarkable variety of goods passing into and out of Belfast makes an interesting contrast in the annual report issued by the Belfast Harbour Commissioners. The timber trade is progressing, as 66,497 loads of deals were landed at the port during 1929, compared with 58,765 for 1928. The imports of machinery also went up substantially, the figures for 1929 being 14,461 tons, against 10,432 tons during the preceding year.

The imports of tea were 5,284 tons, or 111 tons higher than in 1928, while 33,945 tons of sugar were brought in, as compared with 31,089 tons in the previous twelve months. There was also a considerable increase in the quantity of manufactured tobacco imported, the figures for 1929 being 3,350 tons and for 1928 2,975 tons.

Linen yarns imports rose from 3,727 tons in 1928 to 5,598 tons last year, while the imports of cotton went up from 3,543 tons in 1928 to 4,151 tons in 1929.

The figures of exports are equally interesting. Last year 4,544 tons of linen yarn were sent out of the country, against 4,593 tons in 1928; but woollen exports improved, as well as the export of thread, the figures of the latter being 2,239 tons, compared with 2,204 tons in 1928. Whisky exports went down from 4,263 tons in 1928 to 4,191 tons in 1929. On the whole, however, the trade returns were well up to those of previous years, suggesting that industry is on the up-grade in Ulster.

Traffic Returns.

The report of the Harbourmaster presented at a meeting of Belfast Harbour Commissioners on March 3rd showed that 305 vessels arrived at the port between February 16th and March 1st as follows:—Coastwise and cross-channel 275, foreign 20, non-trading 10.

The total tonnage of vessels arriving at the port from January 1st to March 1st was:—Coastwise and cross-channel 417,880, an increase of 20,060 over the corresponding period of last year; foreign 93,133, a decrease of 2,611; non-trading 32,344, an increase of 7,433; total 543,357, an increase of 24,882.

Belfast as an Air Port.

The bright future of Belfast as an airport was indicated by a statement made by Lieut.-Colonel A. E. Edwards, the managing director of National Flying Services, Ltd. As already announced in our columns, the Company has entered into an agreement with the Belfast Harbour Commissioners for a site for the aerodrome. The Colonel said it was the intention of the Company, once the aerodrome was provided, to erect the necessary buildings in the form of a hangar which will accommodate 16 light aircraft. There will also be offices, stores, a workshop, a club house, and petrol pumps.

At the beginning four aircraft will be stationed at Belfast; two to be used for training purposes, one for the use of trained personnel, and one, a cabin monoplane, capable of carrying two passengers, in addition to the pilot, for taxi purposes. As soon as the demand made on the aircraft justifies additional machines being stationed at Belfast these will be sent.

Once the Belfast aerodrome is established it is intended to use it as a centre and develop further stations in Northern Ireland, which in the first instance will be fed from Belfast, and later, when the demand for the use of aircraft at the other stations warrants it, develop them into fully operating and independent aerodromes.

Sir William Coates, the Lord Mayor of Belfast, gave some interesting facts regarding the scheme when he spoke at a meeting in the city. He said an offer had been made by the Belfast Harbour Commissioners, in the best interests of the city, of a piece of ground that was very suitable for an aerodrome. It had been inspected by Colonel Edwards and Sir Alan Cobham, both of whom were satisfied that the site was perfect for an aerodrome. It was quite close to the sea, and seaplanes as well as aeroplanes could be accommodated.

The Harbour Commissioners, proceeded Sir William, were willing to spend £6,000 on preparing the site, and they only asked for the sum to be repaid at the rate of £600 per year for ten years. The National Flying Services were willing to contribute £250 per year towards that amount; the Belfast Chamber of Commerce had offered £50 per year for three years; the Ministry of Labour had given a grant equivalent to £150 per year for 13 years. So that there was only £200 of the £600 to be made up. The Corporation were to contribute the £200—a very reasonable proposition.

New 150-ton Electric Crane.

A start has been made on the site near the Thompson graving dock in preparing the ground for the new 150-ton electric crane purchased by the Belfast Harbour Commissioners. Although not the largest in the world, the new crane will rank amongst the giant weight-lifters of the world. At present it is being dismantled at a German port and will shortly be shipped to Belfast. It will be erected by Messrs. Harland and Wolff, Ltd., the great shipbuilders.

The Harbour Commissioners are also engaged in the preliminaries in connection with the new dock, and in the near future a beginning will be made with the work. Already a start has been made with the construction of ten flour mills for Messrs. Joseph Rank & Co., Ltd., on a site adjacent to the new dock. The capital cost of the dock and the mills will be about £500,000.

Rates of Exchange for Port Dues in Yugoslavia.

The Department of Overseas Trade has received from the Commercial Secretary, His Majesty's Legation, Belgrade, the following official rates of exchange for the payment of port dues in Yugoslavia during March, 1930, which appeared in the "Official Gazette" of February 27th:—

	Dinars
1 Gold Napoleon	218·00
1 Gold Turkish Lira	247·00
1 Pound Sterling	276·00
1 American Dollar	56·70
1 Canadian Dollar...	56·40
1 Gold German Mark	13·55
1 Polish Zloty	6·35
1 Austrian Shilling	8·00
1 Belga	7·90
1 Pengo	9·92
1 Brazilian Milreis	6·35
1 Egyptian Pound	283·00
1 Turkish Paper Lira	26·00
100 Turkish Paper Piastres	26·00
100 Gold Francs	1095·80
100 French Francs	222·20
100 Swiss Francs	1095·80
100 Italian Lire	297·20
100 Dutch Florins	2275·00
100 Roumanian Leis	33·70
100 Bulgarian Levas	41·00
100 Danish Crowns	1517·00
100 Swedish Crowns	1520·00
100 Norwegian Crowns	1515·00
100 Pesetas	703·00
100 Greek Drachmas...	73·50
100 Czechoslovak Crowns	168·20
100 Finnish Crowns	143·00
100 Latvian Lat	1089·00

Personal enquiries regarding shipping and transport matters should be made at the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

Notes from the North.

New £1,000,000 Mersey Dock.

With the completion of Messrs. Levers' new £1,000,000 dock at Bromborough, it is under consideration by Messrs. Price's Patent Candle Co., of Bromborough Pool, to have railway lines laid connecting through Messrs. Levers' works and sidings with the railway at Port Sunlight. Messrs. Price's merchandise has previously been conveyed by road or water to Birkenhead.

Proposal to Bridge River Dee.

The £3,000,000 scheme for bridging the Dee between West Kirby and Point of Ayr was discussed at the March meeting of the Flintshire County Council. It was stated that a deputation of the Council had met the Dee Conservancy Board and at the meeting some correspondence was read from the firm of engineers who had brought the scheme forward. The discussion mainly followed expressions of opinion by members of the board, who claimed to have close knowledge of the navigation of the river, that the scheme would injure rather than improve navigation. Mr. Waterhouse said there was a large body of opinion in the county which did not accept the view that the embankment and bridge would interfere considerably with the navigation of the river. He was not prepared to accept unreservedly the opinion of people who claimed to have some engineering insight into the question of the navigation of the river in relation to this scheme. At the meeting of members of the Parliamentary Committee with the Dee Conservancy Board, the views of the engineers seemed to have prevailed, but having regard to the present unexampled unemployment in Flintshire and to the fact that an eminent firm of engineers had put forward the scheme as a thoroughly sound and practical proposition, he thought they should hesitate before accepting local opinion as being the last word on a proposal of such magnitude. In the past, also, expert engineers had declared the feasibility of a Dee embankment scheme. It did not appear that the engineer of the Dee Conservancy Board had definitely turned down the scheme, so it would be unwise to imagine it was not in existence as a possible solution of the unemployment problem in Flintshire. Mr. W. H. Roberts said the men who had navigated the river for thirty or forty years contended that the embankment scheme would be detrimental, and their opinion had weighed with the Dee Conservancy Board. The matter will come before the Council at a later meeting.

Ship Canal Traffic.

According to the monthly approximate traffic return of the Manchester Ship Canal Company issued on 15th March, traffic for the month of February brought in receipts amounting to £100,425, which is a decrease of £5,420 on February of last year. February was not as good a month as January, when the receipts were £116,420.

Manchester's Record.

Manchester Ship Canal in the year 1929 carried 6,344,000 tons of seaborne traffic, a figure that has only once been exceeded in the history of the company, and that was in the year 1926, when the traffic was abnormally affected by the large imports of coal arising from the unfortunate coal strike in that year. There is a sure and steady expansion of the volume of traffic using the Canal. In 1929 there was an increase of 322,000 tons over the year 1928 and an increase of £11,766 in receipts. The receipts, however, were affected by the reduction in charges which operated for the last three months of the year, against which there is the relief in expenditure on local rates arising from the derating provisions of the Local Government Act. Mr. W. C. Bacon stated at the annual meeting of the company that the expenditure showed a decrease for the year of £17,340, as compared with the year 1928. There was a saving in the cost of dredging and maintenance of the Ship Canal. The saving in dredging was partly accounted for by the comparatively dry summer and the absence of floods, which, when they occur, bring down a lot of detritus from the streams flowing into the Ship Canal. The net revenue from the working of the Ship Canal for the year 1929 amounted to £801,994, as compared with £767,134 in 1928—an increase of £34,860. The net revenue from the working of the Bridgewater canals (excluding railways, rents, and miscellaneous receipts) amounted to £5,513, against £7,645 the previous year. The net receipts of the whole undertaking, Ship Canal, Bridgewater Canals, and working of railways, amounted to £854,225 and miscellaneous receipts to £47,779, making a total of £902,004. Deducting from this miscellaneous charges, chief rents, wayleaves, rent on elevators, docks and transit sheds, together amounting to £105,250, there remained a net revenue for the year of £796,754, as compared with £761,352 for 1928—an increase of £35,402. After deducting interest on loan capital of £417,251 there was left a balance available for dividend of £396,001. In 1894 the seaborne traffic using the canal was 686,158 tons; barge traffic 239,501 tons; ship canal tolls, ship dues and miscellaneous receipts £97,901. By 1904 the total canal traffic amounted to 3,917,578 tons and revenue £418,043. In 1914 the figures were 5,424,732 tons and revenue £656,237.

Here is an interesting summary of the toll-paying merchandise traffic and receipts of the port for the last few years:—

Year.	Sea-borne Traffic.	Barge Traffic.	Total.	Ship Canal Tolls, Ship Dues and Miscellaneous Receipts.
1915 ...	5,115,954	318,092	5,434,046	757,268
1916 ...	4,540,167	318,582	4,858,749	831,684
1917 ...	3,843,324	309,430	4,152,754	861,996
1918 ...	3,229,293	268,702	3,497,995	990,923
1919 ..	3,313,620	275,423	3,589,043	1,203,361
1920 ...	4,099,326	288,037	4,387,363	1,461,909
1921 ...	3,117,469	176,201	3,293,670	1,197,075
1922 ...	4,081,571	191,973	4,273,544	1,382,490
1923 ...	5,107,648	256,292	5,363,940	1,384,743
1924 ...	5,181,615	253,893	5,435,508	1,463,656
1925 ...	5,622,405	259,286	5,881,691	1,493,544
1926 ...	6,533,780	297,099	6,830,879	1,592,219
1927 ...	6,099,636	259,784	6,359,420	1,576,237
1928 ...	6,021,316	235,579	6,256,895	1,517,018
1929 ...	6,344,005	214,584	6,558,589	1,528,784

Fleetwood Docks.

Officials of the London, Midland and Scottish Railway Company, who own the Fleetwood docks, visited Fleetwood on 13th March to observe the progress that is being made with the dock development scheme. Around three-parts of the fish dock are the sheds in which the fish is marketed. Within them are the huts, which form the offices of those who deal in the fish. This market has till now been 70 feet deep; it is being carried back to 100 feet. The market is 2,000 feet long. The entrance from the Wyre Dock to the fish dock is to be widened from 43 feet to 50 feet; a new tug to help trawlers into the dock has already been put into commission at a cost of £12,000 and a new triple slipway for repairing and overhauling trawlers has been provided for £26,000. New roads and sidings have been made or are in contemplation and the ground for storing boxes has been much increased. About £3,000,000 is invested in the Fleetwood trawling industry and allied trades and about 6,000 men and boys are employed. Trawlers from other ports are being attracted to the town, and perhaps the nearness of the fishing grounds accounts for that. The grounds fished are chiefly about the Western Hebrides, the Faroe Island, Rockall and south of Iceland.

Fleetwood fish traders are contemplating the preparation of a petition to the L.M.S. Railway Company for the removal of the Wyre Dock Station to a more convenient site. It is suggested that the new station should be situated from 400 to 500 yards from Burn Naze, with a subway approach from Copse-road. This, it is suggested, would be a great convenience to traders of the port.

Personal.

Mr. Thomas Foxcroft Haythornthwaite, of Birkenhead, who died on 13th March, was an old an experienced official of the Mersey Docks and Harbour Board. He entered the service of the Mersey Docks and Harbour Board in the warehouse department in June, 1880, and was later appointed traffic manager of district "A," in charge of the traffic at Alexandra and Hornby Docks, Liverpool, from which position he retired in July, 1919.

Sir William Dudley, of Runcorn, who has been appointed chairman of the Bridgewater Canal Company, commenced work at the age of 15 years as an office boy in the company's offices. He was born in very humble surroundings in Runcorn and as a boy attended the Runcorn Parish Church School. He is an expert shorthand writer and some years ago taught the art at Runcorn evening schools.

Denial of Mersey Tunnel Rumour.

How the story that it was intended to utilise the lower section of the new Mersey Tunnel for railway goods traffic gained currency it is impossible to fathom. Rumour had it that the Tunnel Joint Committee had opened negotiations with the Mersey Docks and Harbour Board and the different railway groups to carry out the plan. Mr. A. W. Bibby, Chairman of the Mersey Docks and Harbour Board, gave the story its quietus a few days ago when he confessed the news of the negotiations came as a surprise to him. What may have taken place with the other parties associated with the rumour he did not know, but there had been no correspondence or communication between the Board and any of the tunnel people for the last two or three months.

Notes from the North– continued.

Dock Board Sells Lighthouse.

Agreement has been reached between the Mersey Docks and Harbour Board and the Wallasey Corporation, who are now to acquire for £900 the long-disused Leasowe Lighthouse, with the surrounding 2,873 square yards of land, which will thus become an adjunct of the Leasowe Common, which is now the property of the Wallasey Corporation. The Leasowe Lighthouse was built in 1824 to replace one erected in 1763. The date stone, with the inscription

M.
W. G.
1763

which is built into the present structure, was originally in the older house. It commemorates William Gregson, who was Mayor of Liverpool in that year. The lighthouse was last lighted on July 14th, 1908. Two lighthouses were built at Leasowe in 1763. One of these, to the westward of the position of the present lighthouse, became useless through coast erosion and was replaced in 1771 by the one on Bidston Hill.

Wallasey Ferry.

As a preliminary to the carrying out of the £20,000 scheme for the improvement of the Seacombe Ferry approach by the clearing away of the workshops so as to provide improved facilities for ferry traffic, the old goods pier and hydraulic lift columns are to be sold and removed. A new passenger bridge is to be substituted, by means of which passengers arriving from Liverpool will have direct access to the pierhead, the present bridge being reserved for outgoing passengers.

No New Manchester Works, unless—

In common with other authorities, Manchester Ship Canal Company has been invited by the Lord Privy Seal to submit schemes for the carrying out of works to relieve unemployment, on which they would receive part of the interest charge for a period of years, and perhaps the whole interest during the period of construction. Up to the present time, however, the directors have not seen their way to put forward any such scheme, but they have the matter still under consideration. In the last few years they have spent £890,387 on works, on which they are still receiving contributions of interest from the Unemployment Grants Committee. These works were in anticipation of requirements for a number of years ahead. The Company feel that in the present state of trade they cannot undertake further commitments except where they are satisfied that the requirements will definitely mature within the time-limits of the Government scheme. The Co-operative Wholesale Society, Ltd., have purchased land from the Company at Ordsall Lane and are now engaged in erecting a tea warehouse there, which it is hoped will increase the imports of tea to Manchester.

Llandudno Sea Defences.

Concerning the proposed sea defences at Llandudno, the Minister of Health, who recently authorised an inquiry into the Council's application to borrow £13,326 for sea-defence works, writes to the Council to say that he has been advised that the necessity for the spur and revetment (or apron) at and along the pier retaining wall has not been established, and that the present conditions do not appear to warrant any expenditure being incurred. In view, however, of the damaged state of the old apron along the vertical Marine Parade wall, it appeared to be desirable to provide a boulder apron on the lines proposed, omitting the footpath, which would appear to serve no useful purpose. As regards the proposed groynes, the Minister is advised that the timber groynes between the two jetties is not likely to achieve the desired object of preventing an escape of sand from the embankment, and this should therefore be omitted. As to the five other groynes proposed, the Department considered that these may be approved in principle as an experiment, but it is not thought necessary to construct the shore ends of so heavy a type on this beach. Further, the type of slab groyne proposed does not appear to the Ministry to be satisfactory either from the point of view of stability or that of ease of manufacture, and probably the more usual triangular section would prove satisfactory in these directions. It was further stated that it is a matter for consideration whether such a form of construction would not serve from the Parade revetment to L.W.M., using possibly slab sections of graduated height, but no objection would be offered the use of the case type of groyne over the lower part of the beach as proposed, provided the planking slab be carried down below beach level. The Ministry asked that a revised plan and estimate should be submitted in due course.

Coast Erosion Conference.

Representatives from the Lancashire and Cheshire County Councils and of the local authorities affected by the erosion of the banks of the River Mersey attended a conference at Manchester on March 6th. A report of the proposed scheme to straighten the river by by-passes was submitted and, after being discussed at length, was approved. The cost of this will be approximately £150,000. A delegation was appointed to interview the Manchester Ship Canal Company upon the matter, and the scheme will be submitted to the Unemployment Grants Committee of the Government for the purpose of a grant. The cost will be borne by the County Councils and the respective local authorities. It is hoped that no time will be lost in putting it into operation, as it would employ a large number of men. The representatives of the Councils who attended to gain information upon the scheme will now report to their authorities to ask for their support for the two County Councils. The matter is one of urgency, as during the last few years very considerable sums have been spent by the local authorities to keep back the inroads made by the floods. All these efforts, although costly, have only been temporary palliatives, and the necessity of a big scheme is obvious to all who have seen the condition of the river banks.

Big Expenditure for River Wall.

Liverpool City Council has accepted, subject to the approval of the Ministry of Health, the tender of Messrs. Sir Robert MacAlpine and Sons, Liverpool, for the construction of the river wall forming part of the Otterspool improvement scheme, in accordance with specification, plans, sections, drawings, quantities, and general conditions prepared by the City Engineer, for the sum of £114,729 11s. 6d.

Watching Charges for Goods on Quay.

Mersey Docks and Harbour Board has amended Bye-law No. 11 of the Master Porters' Bye-laws, which governs the watching of goods on the quay. It is provided that a master porter shall continue to watch goods discharged from a vessel for which he is acting as master porter until the goods are actually loaded off from the quay, but he is not under any obligation to watch (1) goods remaining on the quay when all the goods belong to the master porter; (2) goods remaining on the quay in respect of which the consignees or consignee of all such goods shall have given notice in writing to the master porter that the watching of goods is no longer required; (3) log timber remaining on the quay (whether there are other goods remaining on the quay or not) in respect of which the consignees or consignee of all such log timber shall have given notice in writing to the master porter that the watching of the timber is no longer required.

A Record Consignment of Molasses.

A record cargo of molasses, 16,000 tons, was recently discharged at Birkenhead from the tank steamer "Athelcrown," owned by the Pure Cane Molasses Company. As soon as she docked at Birkenhead the pumping of this enormous quantity of molasses was commenced on the afternoon of that day. She completed her discharge in three days.

Gelignite Disappears from Dock Board Magazine.

The theft of eight pounds of gelignite, sufficient high explosive to cause great material damage, from one of the Mersey Docks and Harbour Board's powder magazines in Seacombe caused the police authorities some anxiety. The door of the powder magazine was found to have been forced open with a sharp instrument and the missing gelignite extracted. This particular type of high explosive has been used in safe-breaking, but unless it is handled by an expert it is extremely dangerous. Five small pills of gelignite placed together are enough to shatter two cubic yards of solid rock, and, if distributed, will shatter twice that quantity. Each of the eight charges was cylindrical in shape, 11½-in. long and 1½-in. in diameter. The gelignite, which is stored in the powder magazine, is kept for blasting operations in excavation on the Mersey Docks and Harbour Board's estate on both sides of the river. Within three days the police recovered the stolen gelignite and made an arrest.

Mersey Tunnel Progress.

Good progress is being made on all the contracts for the construction of the Mersey Tunnel. In practically every section contractors are ahead of scheduled times. The total work on Contracts 2, 3, and 4 is 58 per cent. completed, and 63 per cent. of the total excavation work on these contracts is done.

Contract 2 is of value £1,413,601; work done to date, 81.7 per cent. Total contract excavation 260,000 cubic yards; excavated to date, 87.5 per cent. Men employed, 675. This contract comprises the construction of the 44-ft. diameter iron-lined tunnel between the shafts at George's Dock, Liverpool, and the Morpeth Branch Dock, Birkenhead. The enlargement of original headings to the full-sized tunnel is proceeding at eight working faces. Of the cast-iron lining there is in place 83.1 per cent. of the total of 52,600 tons in the contract. This is 14.3 per cent. ahead of the scheduled programme. The whole of the upper half of the cast-iron lining is in place. Work is in

Notes from the North—continued.

progress on the lower half of the cast-iron lining at six working faces, and some 67 per cent. of this half is now in place.

Contract 3, value £749,075; work done to date, 37.7 per cent. Total contract excavation, 185,000 cubic yards; excavated to date, 50.8 per cent. Men employed, 520.

Contract 4, value £670,390; work done to date, 30.4 per cent. Total contract excavation, 174,500 cubic yards; excavated to date, 39.5 per cent. Men employed, 365. This contract is for the full-sized tunnels on the Liverpool side. Underground the tunnel work is proceeding at eight points.

Turbo-Electric Equipment.

The Ellerman liner "City of Hongkong," which was the first ship to be fitted with the new Metropolitan Vickers exhaust turbo-electric equipment for ship propulsion, is the largest vessel using the Manchester Ship Canal at present. The official trials of this vessel showed the remarkable fuel-saving of 23 per cent., and the performance of the vessel with the equipment on its Indian service shows results equally good. The Metropolitan Vickers Company has now similar equipment in hand for five other vessels.

Mersey Ferry Finances.

The surplus on the Wallasey Ferries account for the year 1929-30 is £31,159, as compared with the estimate of £15,902, an improvement of £15,257. This improvement is largely accounted for by savings of £2,981 in coal, due to the contracts being placed at a lower price than was anticipated, and also to economy in consumption of 384 tons. There is a reduction in rates of £2,157 in consequence of the successful claim put forward that the ferries undertaking was entitled to derating under the Local Government Act of 1929 as from October 1st last. As against the savings there is an excess expenditure of £1,182 in respect of repairs to Egremont Landing. During the course of the work of sealing and painting it was found that parts of the iron structure were badly corroded and it was necessary to completely renew these parts. For 1930-31 is anticipated a surplus of £20,591. Traffic expenses are put at £775 more than last year's estimate. General repairs and maintenance are put down as £1,350 less than last year, chiefly owing to less repairs being anticipated to the steamers. General expenses are £4,807 less than last year's estimate, principally accounted for in the saving of rates due to the Derating Act.

Manchester Ship Canal Bridges.

The Manchester Ship Canal Company have obtained a perpetual injunction restraining M.R.S., Ltd., haulage contractors, Liverpool, from driving, except with the consent of the plaintiffs, any locomotive over any of the bridges for the repair of which the plaintiffs are liable and on which a conspicuous notice has been placed. This injunction is the outcome of the defendant Company having taken a locomotive, which together with its load weighed over 70 tons, across the Northwich road swing bridge over the ship canal, after having been warned by one of the plaintiff's servants that the weight was far in excess of that permitted. It was stated that as the Canal Company are under statutory obligation to maintain their waterways, and have to guard the public against the inconvenience of traffic dislocation both on their canals and on the roads crossing them, they are compelled to ensure that the bridges, for the maintenance of which they are responsible, are not endangered by unreasonable use.

Protect Chains in Frosty Weather.

That chains should be protected in frosty weather was recommended by a Liverpool jury at an inquest on a dock labourer whose death was caused by the snapping of an iron chain used in connection with a 35-cwt. derrick on the P.S.N.C. motor vessel "Loreta" in Canada Dock, Liverpool. It seems that a dock labourer was ordered to raise the derrick about three feet to facilitate loading. To do this he placed a "chain stopper" in position. This snapped immediately a strain was placed on it. The derrick fell on the ship's rail and struck deceased. Captain Bowley, chief stevedore of the P.S.N.C., stated that the "Loreta" had been in Glasgow for about a month and during that time there had been a severe frost. This affected chains and made them brittle. He had seen chain links fracture when they were thrown on the deck.

Collapse of Mersey River Wall.

A portion of the river wall at Pier Head, Liverpool, in front of the offices of the Mersey Docks and Harbour Board and at the rear of the south end of the Liverpool landing stage collapsed on the evening of 15th March and many tons of stone and debris crashed into the Mersey. About 60-ft. of the wall caved in, the affected part being almost directly above the river portion of the new Mersey Tunnel. Below the wall, lying on the bed of the river, are a number of sluice pipes used by the Mersey Docks and Harbour Board. Two of these bore the tremendous weight of fallen masonry and an examination is to be made to ascertain if they have been damaged. They are used to flush away the sand which accumulates under the south end of the landing-stage, so that the natural rise and fall of the structure on the floating pontoons may operate without obstruction. It is thought, however, that the pressure of waer from the sluices still operating will be sufficient to keep the stage clear until repairs have been effected. Close to the breach are two huge mooring chains which hold the landing stage in position. These appear to be firmly secured and the rock to which they are attached shows no sign of weakness. As a precautionary measure, however, several steel cables were slung into position and attached to bollards on the stage. The bridge which leads to the Rock Ferry and Birkenhead ferry-boats was barricaded and closed to the public.

The scene of the collapse was subsequently inspected by officials from the Mersey Docks and Harbour Board, the Liverpool Corporation, and engineers from the new Mersey Tunnel workings. At this point there are forty feet of solid rock over the tunnel. A thorough examination of the tunnel and workings has been made but no damage has been found. It is believed that the collapse has been caused by the action of the sea water during the recent spring tides.

The damage, at first thought to be confined to the actual space represented by the subsidence, is in reality much more extensive. Not only have many tons of masonry collapsed on to the river bed, shattering gas pipes and water pipes in their fall, but for many yards around the asphalt covering the rubble which forms the foundation of the Pier-head has cracked under the increased strain, and the high tides scooped out yawning caverns beneath. There are several miniature caverns and the asphalt itself cracked over an area of about 100-ft. Many feet of piping running parallel with the river have been torn away and the broken ends are left projecting from the rubble.

Draught of Vessels using Kiel Canal.

Messrs. Sartori and Berger, of Kiel, announce that the draught of vessels using the Kiel Canal has been fixed at 9.5 metres (approximately 31-ft.). Vessels with a slightly greater draught wishing to use the canal should communicate with the firm in advance so that permission may be obtained, if possible, from the authorities.

Announcement of Dividend by the Marconi Company.

The Marconi International Marine Communication Company Limited announces that the Report of the Directors and the Accounts for the year ended 31st December, 1929, were posted to shareholders recently.

At the annual meeting, which will be held on Wednesday, the 2nd April, the shareholders will be asked to approve the payment of a final dividend of 10 per cent. (less tax), making a total dividend for the year 1929 of 15 per cent.

Tenders required for Hopper Barges for Casablanca (Morocco)

The Acting British Consul at Casablanca reports that the Moroccan Ministry of Public Works is calling for tenders, to be presented in Casablanca by the 30th April, 1930, for the supply of two steel hopper barges, new or second-hand.

Firms desirous of offering British-built barges can obtain further particulars of this call for tenders upon application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. Reference number A.X. 9311 should be quoted.

Reduction of Charges on Small Cargoes at New Orleans.

In line with their intention to reduce the cost of port business at New Orleans wherever possible, the Board of Commissioners of the Port of New Orleans have announced, effective March 1st, a modification of charges applying against passenger and freight steamships which handle limited amounts of cargo.

Under the schedule for this class of vessels, handling 500 tons or less, they will be allowed two days for accumulation of cargo, and will be charged the present passenger rate for dockage-wharfage of one cent per gross ton per day for a period not exceeding two days at the wharf. The regular charges applied against vessels loading cargo will not apply in their case, but they will be charged shed-hire at the rate of two and one-half cents per hundred pounds of cargo handled. If such vessels remain in port more than two days or load more than 500 tons, the regular tariff, based on gross tonnage, will apply.

While this change will affect only a few vessels, it will encourage and expedite the movement of small lots of fast freight, and enable the vessels in question to handle important consignments which were not attractive under the existing schedule.

The Port of London Authority.

Tilbury Passenger Landing Stage.

The Port of London Authority announce that the new passenger landing stage in the river at Tilbury will be opened on Friday, the 16th May, 1930. The ceremony will be performed by the Prime Minister.

The new facilities for the embarkation and disembarkation of passengers at Tilbury have been carried out by the Port of London Authority in conjunction with the London Midland and Scottish Railway Company. A floating stage and a baggage hall on shore have been constructed by the Port of London Authority and the Railway Company have reconstructed and enlarged their railway station adjoining.

The Tilbury passenger landing stage renders it possible to discontinue the practice of embarking and disembarking passengers by tender between the shore and vessels lying in the river, or, alternatively, of passengers waiting on board ship until the vessel reaches her berth in dock.

London's Increasing Shipping.

January was a very good month as regards shipping for the Port of London. During that month 4,967,570 net register tons used the Port, an increase of 173,873 net register tons compared with January, 1929.

The figures for the Port for the ten months ended January, 1930, are also satisfactory, and are as follows.—

	Net Reg. Tons.
10 months ended January, 1930 ...	49,319,869
10 months ended January, 1929 ...	47,010,451

The ten months ended January, 1930, were thus better than the ten months ended January, 1929, by 2,309,418 net register tons or 9.7 per cent. During the period under review the total tonnage of vessels that used all United Kingdom ports increased by 14.3 per cent.

The Port of London Authority's dry docks have also been in greater demand, as the following figures show:—

	Tons Gross.
10 months ended January, 1930 ...	2,730,040
10 months ended January, 1929 ...	2,504,504
Increase ...	225,536

More Trade passing through London.

Although statistics of the movement of goods for the whole of the Port of London are not available, the tonnage of goods handled by the Port of London Authority gives a fair indication of affairs. During the ten months ended January, 1930, the goods landed were 147,983 tons, or 8.3 per cent. more than during the corresponding period of 1928-1929.

The commodities which have arrived in the Port in larger quantities include:—

	Ten Months to Jan., 1929. Tons.	Ten Months to Jan., 1930. Tons.
Dried fruit	95,416 ...	108,692
Millboards and wood pulp ...	669,013 ...	771,509
Butter and margarine	117,650 ...	124,474
Canned goods	193,411 ...	198,224
Tea	184,135 ...	202,012
Wines	29,891 ...	37,576
Wood	1,733,446 ...	2,004,554
Wool	106,650 ...	133,745

Commodities arriving in rather smaller quantities include:—

	Ten Months to Jan., 1929. Tons.	Ten Months to Jan., 1930. Tons.
Cocoa and coffee	34,357 ...	32,841
Fruit (green and vegetables) ...	488,662 ...	482,479
Oil, tallow, etc.	307,613 ...	302,838
Meat	512,949 ...	496,952

London's Shipping Traffic.

During the week ended 28th February, 959 vessels, representing 1,007,511 net register tons, used the Port of London. Of these 603 vessels (824,093 net register tons) arrived from or sailed for foreign ports and 351 vessels (183,418 net register tons) were engaged in the coastwise trade.

Nine vessels brought meat cargoes. They were the "Mooltan," "Port Campbell," "Ruahine," "Mataroa," "Maimoa" and "Mahia" from Australia, and the "Avila Star," "Highland Chieftain" and "Ionic Star" from South America.

Altogether there were landed from these vessels approximately 509,374 carcases lamb and mutton, 103,727 quarters beef, a quantity of frozen pork and rabbits and about 39,500 packages of sundries.

During the week ended 7th March, 989 vessels, representing 861,096 net register tons, used the Port of London. Of these 506 vessels (677,273 net register tons) arrived from or sailed for Colonial or Foreign ports and 483 vessels (183,823 net register tons) were engaged in coastwise trade.

Six vessels arrived with meat cargoes; three from Australia, the "Ormonde," "Port Darwin" and "Buteshire," and three from South America, the "Dugnesa," "Afric Star" and "Coracero." Together they brought 217,122 carcases of lamb and mutton, 97,698 quarters beef, quantities of pork and rabbits, and 37,553 packages of sundries.

During the week ended 14th March, 1,037 vessels, representing 966,315 net register tons, used the Port of London. Of these 569 vessels (757,964 net register tons) were from or to foreign ports and 468 vessels (208,351 net register tons) were engaged in the Coastwise Trade.

Eight vessels arrived with meat cargoes—five from Australia, the "Chitral," "Port Huon," "Kent," "Largs Bay" and "Port Sydney," and three from South America, the "Almeda Star," "Highland Brigade" and "Normanstar." Together they brought approximately 309,000 carcases of lamb and mutton, 81,200 quarters beef, 20,700 packages of sundries, besides quantities of frozen pork and rabbits.

During the week ended March 21st 1,223 vessels, representing 959,925 net register tons, arrived at and departed from the Port of London. Of these 537 vessels (746,830 net register tons) were to and from foreign ports and 686 vessels (213,095 net register tons) were engaged in coastwise trade.

Seven vessels brought meat cargoes. Five were from Australia—the "Surrey," "Ferndale," "Orsova," "Rangitata," and "Mahana"—and two from South America, the "Princesa" and "Stuart Star." Together they brought 390,450 carcases lamb and mutton, 86,000 quarters beef, quantities of pork and rabbits, and over 30,000 packages of sundries.

Vessel Lifted 16 feet.

The utility of the new entrance lock over the old lock at Tilbury Docks was well illustrated on March 7th, when the R.M.S. "Chitral," 15,248 tons, was docked at low water, an achievement which could not have been accomplished with the old entrance. The operation involved admitting 1,760,000 cubic feet or 50,000 tons of water through the sluice from the dock in order to lift the vessel 16-ft. to the dock water level.

95,000 Tons of Shipping handled in Six Hours.

The following incidents reflect credit on the Dockmaster's department at the Tilbury Docks and are a tribute to the efficient lay-out of the docks. Recently seven ships aggregating 70,000 tons were locked in and out of the new entrance in the course of six hours. At the same time two other liners were being moved in the dock, so that altogether 95,000 tons of shipping were handled in the short period of six hours.

Twenty-five minutes after the s.s. "City of Leicester" left her berth in the Eastern Branch Dock, the furthermost section of the Tilbury Docks from the new entrance, the vessel had been locked out and was on her course down the river.

Presentation to the High Commissioner for New Zealand.

The Hon. T. M. Wilford, K.C., High Commissioner for New Zealand, recently accepted on behalf of the New Zealand Government, a framed water-colour painting of a scene in the Port of London from Lord Ritchie of Dundee representing the Port of London Authority. The picture shows a vessel being discharged at the Royal Albert Dock and has been specially painted for the Port Authority by Mr. W. Walcot, R.B.A., and is intended to be hung in Parliament House at Wellington.

The link between New Zealand and the Port of London is a very strong one. In 1882 the first shipment of about 106 tons New Zealand frozen meat was received in the Port, and from this small beginning the great New Zealand meat exporting trade has been built up very largely through the selling, distributing and financial facilities of London. A similar policy of centralising in London the disposal of the bulk of New Zealand exports to the United Kingdom of dairy produce and fruit has been equally successful.

The development of New Zealand trade in London has been encouraged by a good deal of capital expenditure on dock handling and storage facilities by the Port of London Authority.

The Port of London Authority's Progress in Twenty-one Years

By an Impartial Observer.

THE coming of age of a commercial institution, as with individuals, presents an appropriate vantage point from which to review past performance, take stock of the present position and assess with reasonable accuracy the potentialities of the future. Twenty-one years have now passed since the Port of London Authority was entrusted with the control of the world's greatest port, a responsibility which implied a wide experience of commerce and shipping and London's special requirements and called for impartial administration, high organising powers, tactful diplomacy and an abounding faith in the future of the port. The ordeal to which the Authority has been subjected during the intervening years has been of a very strenuous character, for, apart from the inherent difficulties of their mission there have been the disturbing influences of the Great War and subsequently a serious and persistent depression in shipping and its affiliated industries. How the Trust has emerged from the strain of so severe a testing time is shown later, but here it may be briefly mentioned that the trade of the port has shown a gratifying expansion and side by side with this improvement additional dock accommodation and other equipment have been provided to meet the needs of further expansion.

The task they were called upon to face at the outset of their career was a very serious one as will be seen from the concluding paragraph of the report of the Royal Commission appointed in 1900 and which ably summarised the disabilities from which the port then suffered and indicated the complex character of the responsibilities which would devolve upon the body entrusted with their amelioration.

"Our enquiry into the conditions of the Port of London," states this historic pronouncement, "has convinced us of its splendid natural advantages. Among these are the geographical position of the port; the magnitude, wealth and energy of the population behind it; the fine approach from the sea; the river tides strong enough to transport traffic easily to all parts, yet not so violent as to make navigation difficult; land along the shores of a character suitable for dock construction and all commercial purposes. In addition to these advantages London possesses docks, which though they are not in some cases upon the level of modern requirements are yet capacious and capable of further development. The deficiencies of London as a port are not due to any physical circumstances but to causes which may easily be removed by a better organisation of administrative and financial powers. The great increase in the size and draught of ocean-going ships has made extensive works necessary both in the river and in the docks, but the dispersion of powers among several authorities and companies has prevented any systematic execution of adequate improvements. Hence the port has for a time failed to keep pace with the developments of modern population and commerce and has shown signs of losing that position relatively to other ports, British and foreign, which it has held for so long. The shortcomings of the past cannot be remedied without considerable outlay. We are, however, convinced that if in this great national concern energy and courage be shown there is no reason to fear that the welfare of the Port of London will be permanently impaired."

Centralised Control Imperative.

To realise in true perspective the magnitude of the duties which confronted the Authority on taking office, a brief review of the circumstances which led to its formation may be helpful. Without reflecting in any way upon the energy or prevision of the then-existent dock companies, it may be stated that the facilities provided for ships and their cargoes were inadequate to the strain of steadily-expanding trade and the increasing dimensions of merchant ships. During the closing decade of last century ship owners engaged in the foreign trade had become firmly convinced of the superior economies of bigger vessels, and though the Tilbury Docks had been brought into commission in 1886 it was felt that unless the older systems could be modernised so as to cope with the ever-growing pressure of modern commerce the ship owners and merchants of London would be handicapped by the more progressive methods of ports which enjoyed the advantages, financial or otherwise, which resulted from centralised control. A century earlier the trade of the port had similarly overtaken facilities provided for its conduct. There were then no wet docks save two which were regarded more as experiments than serious attempts to solve the port's congestion problems and ships either loaded or discharged their cargoes at crowded wharves or did so to or from lighters while moored in mid-stream. The congestion and delay of such methods can be readily imagined, but a still more serious consequence was the organised wholesale pillage perpetrated by those engaged in the transport of goods between ship and shore. Small wonder, therefore, that a Parliamentary Committee was appointed to consider remedial measures. This action served the useful purpose of focussing pubic attention upon the gravity of the menace threatening the trade of London, and a body of West Indian merchants had little difficulty in obtaining the requisite statutory powers to construct an enclosed wet dock. This was the West India Dock which was opened for traffic in 1802, and in 1805 another, the London Dock, was brought into commission. These early docks with their stout enclosing walls were rather suggestive of well-defended fortresses than peaceful havens for the accommodation of ships and merchandise. Their efficacy, however, in safeguarding the property of the ship owner and merchant from plunder soon became apparent, and so too did the superior dispatch afforded to the vessels which moored alongside their quays. Those who constructed them built better than they thought, for these pioneer docks, modernised as they have been from time to time when the exactions of developing trade necessitated, are still part and parcel of London's dock estate and performing excellent service in providing facilities for the smaller units of the heterogenous fleets using the port. Other dock accommodation dating to the same period was provided by the East India Company, which in 1838 amalgamated its dock enterprises with the West India undertaking and so terminated a ruinous competition.

London's first attempt at a dock, if we except those affiliated to the ship building yards, was on the south side of the river, and after serving from 1700 onwards as the headquarters of the whaling interests centred on London had become the nucleus of a group of docks which developed into the Surrey Commercial system. The St. Katherine dock, not far removed from the Tower, was available for traffic in 1828 and after maintaining a separate entity until 1864 merged its fortunes with those of the London Dock Company when the Victoria Dock, which had been in operation since 1855, was also absorbed. Millwall Dock, situated like the India Docks in the Isle of Dogs, was brought into commission in 1868, and twelve years later the London and St. Katherine Company supplemented the accommodation of the Victoria Dock by adding the magnificent Royal Albert Dock to the facilities of the port. This enterprising policy acted as a spur to the East and West India Company, who, realising the limitation of their docks, especially in view of the increasing size of ships, decided upon the bold step of building a dock at Tilbury, 26 miles from London Bridge. The dock, which, as already mentioned, was opened in 1886, failed to attract sufficient business to make it a paying proposition, especially as the estimated cost of £1,100,000 had, owing chiefly to difficulties with the original contractors, risen to £2,800,000. To draw custom, charges were reduced, and their competitors also cutting their rates, a ruinous competition was instituted which involved the various undertakings concerned in serious losses. Eventually a working arrangement was agreed upon under which the rival concerns were operated by the London and India Docks Joint Committee and eventually became amalgamated. During the closing years of the 19th century the accommodation of the port was thus in the hands of three companies—the Surrey Commercial, Millwall and the London and India Docks Company, while in addition there were the riverside wharves and warehouses, but the combined facilities of all were woefully inadequate to requirements and as was the case a century earlier, the dissatisfaction of merchants and traders culminated in Parliamentary action being taken and a Royal Commission was deputed to enquire into the general conditions of the port and report whether any other improvement was necessary for the promotion of trade and the public interest. The indictment brought against the existent condition of things was a heavy one—inadequate facilities both for ships and goods; insufficient depth in the channel leading to the docks; confusion of control: excessive dock charges and general congestion and delay. The Commission did its work thoroughly and impartially and presented its report in June, 1902, but it was not until December, 1908, that the "Port of London Act," which embodied its recommendations with certain modifications, received the Royal Assent, and on March 16th of the following year the "Authority," which it called into being, held its first meeting.

The Authority and its Powers.

As constituted by Act of Parliament, the Authority consists of 28 members, one of whom is appointed by the Admiralty, two by the Ministry of Transport, four by the London County

The Port of London Authority—continued.

Council, two by the Corporation of the City of London, and one by Trinity House, and the remaining 18 being elected by the payers of rates, wharfingers and owners, and owners of river craft. The Act also empowers the Authority to appoint a chairman and a vice-chairman from outside their number.

The first chairman, who was appointed by the Board of Trade, was Sir Hudson Ewbanke Kearley, M.P., and he continued to hold office until 1925, when on his retirement he was succeeded in 1925 by the Right Honourable Lord Ritchie of Dundee. Viscount Devonport, as he became, had been Parliamentary Secretary to the Board of Trade and had played an important part in the passage of the Bill through Parliament. The Authority set out with the ideal to make London a thoroughly efficient port so that it would continue to be a national and imperial asset of the first importance.

Before seeing how this ideal has been consistently striven for and the marvellous progress which has been achieved the duties vested in the Authority may be shortly indicated. They were to take over and make good any deficiencies in accommodation, equipment and service both for ships and goods; become conservators of the estuarial waters of the Thames; police the docks; take over the duties and powers of the Watermen's Company relative to the registration and licensing of craft and boats and the control of watermen, draw up a schedule of rates for approval by the Board of Trade, and generally " take into consideration the state of the river and the accommodation and facilities afforded in the Port of London and take such steps, subject to the provisions of the Act, as they may consider necessary for the improvement thereof."

Wide powers indeed, which called for very delicate handling, especially when it is remembered that London trade is a plant of centuries growth and therefore very sensitive to any interference with its long-established customs, and the difficulty of the position was enhanced by the fact that the Act did not remove the competition of the wharfingers, who from time immemorial had handled ships at their riverside quays and stored their cargoes in the ancillary warehouses. On the contrary it was stipulated that one of the elected members of the Authority should be returned at the triennial elections as the representative of the wharfingers.

Looking back at the early days of the Authority, it is impossible to refrain from paying tribute to the wisdom of the policy inaugurated by the Authority. It was not in the nature of things that so sweeping a revolution as the Act effected could give universal satisfaction. Jealousies were engendered and it was urged that traditional vested interests would be violated by the new body and the routine of business disastrously interfered with. The Authority, however, ignored such criticism and went about their work with a well-ordered thoroughness which soon fostered a general feeling of confidence in their methods.

Provisional arrangements were made for carrying on, and the routine of the port's business proceeded without friction or any of the dislocation which the prophets of evil had so confidently predicted. Three months after the first meeting the new stock created in satisfaction of the price to be paid for the docks was quoted on the Stock Exchange and within the year the issue to shareholders was completed and the dissolution of the dock companies officially announced.

The purchase price fixed by the Act was, it may be pointed out, £22,362,859, bearing annual interest charges of £802,993. Other liabilities had also to be taken over and at the close of 1910 the capital expenditure of the Authority amounted to £23,028,166. At present the total authorised borrowing powers stand at £43,000,000, out of which there is an unexercised balance of over £4,242,042.

The Improvement of the River.

Having arranged for the conduct of the routine business of the port, the Authority promptly addressed itself to the all-important question of improving its facilities. This was the crux of the position, the prime cause which had called them into being, and according to the manner in which the problem was solved would depend, not only the justification of their raison d'etre, but the future of the shipping business of London and the prosperity of the capital city of the British Empire. A more momentous issue could hardly be imagined. Certainly one of such wide-reaching magnitude had never before, nor has since, confronted the members of a harbour board. It was not a mere matter of ensuring to London a relative superiority in aggregate trade as compared with her rivals in the United Kingdom, nor even ensuring that the Thames would remain the national asset it had ever been since those remote days when the Roman trading galleys first navigated its waters. The issue at stake was of Imperial, in fact of world-wide significance. Ships from London had carried the flag for centuries, not only to our wide-flung possessions but to every part of the world reachable by sea, and there they had exchanged the output of our factories for native wealth mineral, animal or vegetable, its producers well knowing that practically anything usable by mankind found buyers and sellers in London. Thus the world's biggest markets were established on the banks of the Thames and the fame of London and its marts were known through all the seven seas. Obviously, however, they depended for their maintenance upon the services rendered by shipping, and if these, from any cause whatever, were reduced or became less efficient then the markets suffered, and with them London and British prestige. The Royal Commission of 1900-02 was in no doubt whatever that things were not as they should have been with the Port of London, or in the words of their report, that it had " failed to keep pace with the developments of modern commerce." The remedy had to be applied by the Authority who were thus entrusted with the protection of the commercial interests of London, and, despite the seriousness of the proposition they did not hesitate in coming to grips with their task. The question of bigger and bigger ships was then insistent, and it was realised that these could not be attracted to the port unless the requisite facilities of wet and dry docks and an adequate approach channel were forthcoming. In the docks there were dilapidations to be made good and much improved equipment was necessary. The decision of the Authority was a wise one. New docks could wait, but they deemed it imperative that the existent ones should be modernised so far as was practicable, and subject to the condition that there should be the minimum of interference with the trade of the port. They decided also that it was vital the navigable channel should be deepened to meet the requirements of shipping bound to and from the various docks. The duty of maintaining this passage through the estuary had previously been entrusted to the Conservancy, but for some reason or other there had been another failure " to keep pace with the developments of modern commerce." The old dock companies maintained that their docks were as deep as the channel allowed, while on the other hand it was urged that if the docks had been able to take deeper ships the approach would have been deepened accordingly, for there were no extraordinary difficulties in providing and maintaining a fairway of adequate depth and width.

The River Thames is one of the most amenable of rivers, with a comparatively sheltered estuary, a gradual divergence of its banks as it approaches the sea, and a fairly regular deposit of the silt brought down by the stream over the bed of the Estuary and the adjacent seaways. Channels once dredged do not present anything like the difficulty in maintaining them which some harbour authorities have to face, and no revetments or training walls are necessary as the natural scour of the ebb ensures a permanency of depth which is remarkable when compared with the conditions obtaining in other estuaries. These characteristics of London River constitute a great asset, for were the currents violent or the lower reaches of the estuary less sheltered, barge and lighter traffic could not be carried on to anything like its present dimensions.

In resolving to deepen or otherwise improve the navigable channel the Authority acted very wisely as instances were cited before the Commission of vessels having passed Gravesend en route to some up-river dock being compelled to return because they missed the tide and there was no suitable anchorage in the intervening reaches. Under such conditions as these the difficulties of deep draughted ships were of course greatly increased during thick weather. The scheme upon which the Authority embarked was a comprehensive one, as it embraced the whole fairway from the Nore to London Bridge so that the famous Pool was brought within the scope of its operation. Its completion involved the removal of 47,000,000 tons of material at a cost of £2,000,000.

The width of the channel and its minimum depth at low water of spring tides are as follows:—

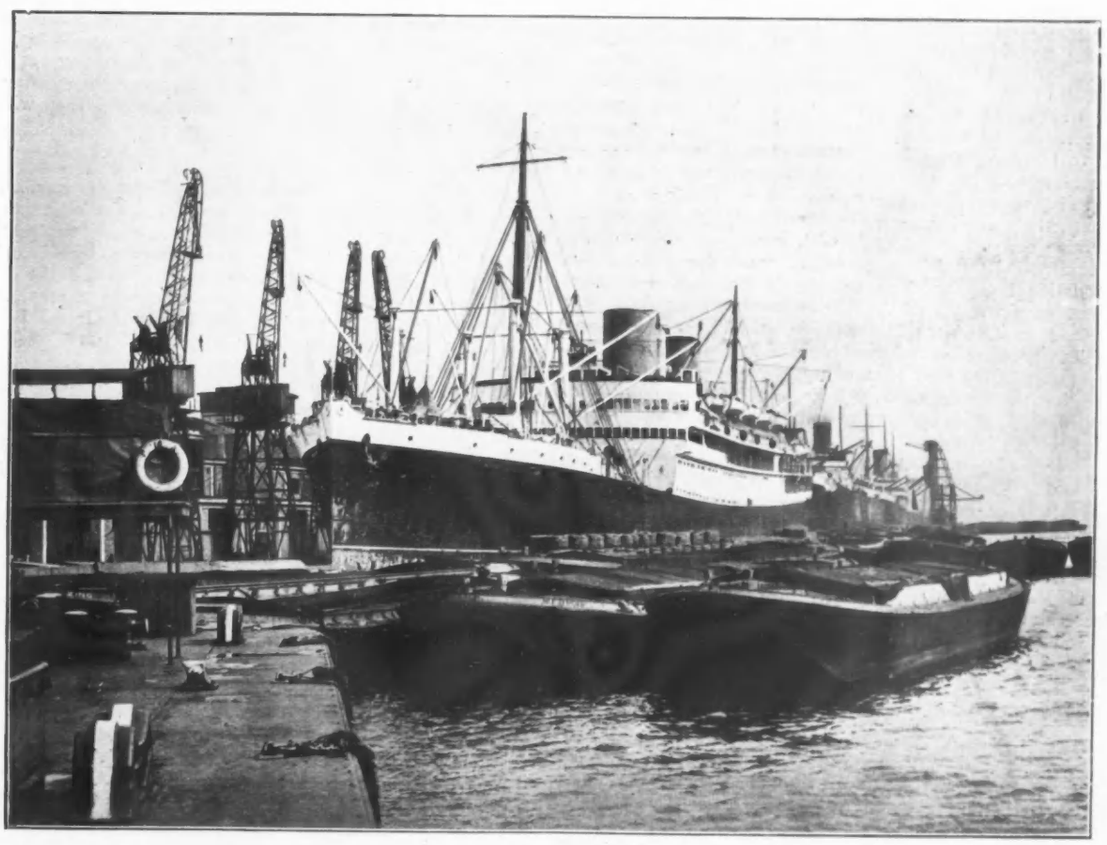
	Width.	Depth.
The Nore to Coldharbour Point	1,000-ft.	30-ft.
Coldharbour Point to Royal Albert Dock ...	600-ft.	27-ft.
Royal Albert Dock to Greenland Dock (Surrey Commercial Docks)	600-ft.	20-ft.
Greenland Dock to the Pool—Varying depths and widths sufficient for fairly large sea-going vessels.		

This extensive dredging programme was commenced in 1910, but its completion was retarded during the war owing to the difficulty of obtaining suitable labour and the fact that the Government requisitioned a considerable part of the plant. In all 26 vessels were chartered from the Authority, some of which were converted into tankers and others into general cargo carriers, the remainder being utilized for their original purpose of dredging.

With regard to this phase of the Authority's activities, it is interesting to note that during the year 1928-29 the quantity of material removed during the maintenance and improvement of the channels was close upon 2,000,000 cubic yards while the mud dredged from the docks was over 1,000,000 tons.

The Port of London Authority.

A typical modern Transit Shed at the Docks. During their 21 years of existence the Port of London Authority have expended £16,000,000 upon new works besides large sums for bringing the Docks up to a first-class standard of maintenance suitable for the requirements of modern ships and all classes of goods.



Liners in the Royal Albert Dock. Since 1909 when the Port of London Authority was established, the Port of London Authority have devoted great attention to bringing the Docks up-to-date and have formulated and carried through large schemes of New Docks and Extensions. The picture shews the modern class of ships now accommodated with the quay equipment at the Royal Albert Docks.

The Port of London Authority—continued.

This policy of deepening the channel leading to the various docks, necessary as it was when the Royal Commission drew attention to its urgency, had become still more essential when the Port of London was established. For example, between 1901 and 1910 the average size of the units of the British India Steam Navigation fleet had increased from 3,375 gross tons to 4,071 tons. The Peninsular and Oriental Company's vessels, which were 5,620 tons average in 1901, were 7,097, while those of the Shaw Savill and Abion Company had risen from 5,588 to 8,380, and the Union-Castle Line ships from 5,815 to 7,184 tons. But this tendency of ship owners to build bigger ships has, since the Authority came into existence, become still more pronounced and the fact that it was so intelligently anticipated by the channel they decided upon shows that they read the signs aright and were determined that the port should be prepared to meet such developments. No shipping undertaking using London as its home port has to consider the depth of the navigable channel to the main London Docks when designing a new ship, as the present fairway admits of the passage of deeper vessels than London owners have yet built, or are likely to build for years to come. The average size of the units of some of the merchant fleets based on London is very striking and shows that the Thames, both in its sea approach and its docks, merits equally with any other harbour the appellation of "deep water" port. Thus the Orient fleet averages 16,785 tons, Nelson Line 14,130, Aberdeen and Commonwealth Line 12,958, Atlantic Transport 11,221, P. and O. 10,837, New Zealand Shipping Company 10,398, and Shaw, Savill and Albion 10,606 tons.

Of "20,000 tonners" there are quite a number which regularly use the port. Orient Line have five of these Leviathans and the Atlantic Transport two, while the enterprise of the P. and O. has required that they should have reinforced their fleet with vessels of this size; some of the Cunard ships included in their London services are also of this size. By day or night they have been able to navigate the channel and the entrances to the docks, and the immunity from accident in so doing directs attention not only to the spaciousness of the fairway and the absence of awkward angles but also to the excellence of the buoying and lighting system and the efficiency of the pilotage service.

Testing Time.

When the Great War broke out the Authority had been in office 5½ years. Its organisation was running smoothly and the early scheme of necessary improvements was well in hand. The shipping and trade of the port had made a steady advance and altogether the signs and portents justified an optimistic outlook and the anticipation of a steady increase in business. During the opening weeks of the struggle there was a rush on the part of the public to provision themselves and the frenzied buying caused a big rise in prices, but the fact that foodstuffs were rapidly accumulating as ships were diverted to London from Continental destinations soon restored public confidence. By the end of the year the supplies of meat, grain, sugar and other foodstuffs had increased so enormously that warehouses were overflowing and both dock and riverside quays were blocked with produce. This congestion naturally led to delays to vessels and the pressure on accommodation both for ships and goods was accentuated by the urgent requirements of the Government. The strain was not confined to London. It was rife at all the ports and perhaps less pronounced on the Thames than elsewhere. Bad as things were, they would have been infinitely worse had it not been for the courageous manner in which the Authority had tackled the question of improving their dock estate. Thus prior to 1914 or during that year the following facilities were added to the equipment of the port:—

London (Western) Dock.—Double storey shed and widened quay. Rebuilding of Tobacco Dock passages. Construction of ferro-concrete jetty with double-storey transit sheds and provision of pumping installation to maintain water level 4-ft. 6-ins. above T.H.W.

Royal Victoria and Albert Docks.—Pumping station for raising water level 2½-ft.; enlargement of Western Dry Dock.

Millwall.—Dry dock extended to 550-ft.

East India Dock.—Three transit sheds on North Quay and double-storey transit shed on East Quay. Pumping station to maintain water-level in docks.

West India Docks.—Widening of North Quay of Export Dock and construction of two transit sheds.

These improvements materially added to the facilities of the port, and the others which were expedited so as to come into operation at the earliest possible date also helped the Authority to better grapple with the difficulties created by the irregular arrival of large cargoes over-taxed distribution machinery, labour problems, and the confusion inevitable to heavy requisitioning of ships, some of which were compelled to discharge export cargo before undertaking their new duties. In fact, they had the situation so well in hand that they could soon regard the congestion as a passing phase which would shortly disappear provided the demands upon the accommodation of the port were not further complicated. From the commencement the aim of the Authority had been to find storage within the port for the abnormally heavy imports and so ease the strain upon the transport services created by rushing cargoes inland to make room for fresh arrivals. Such a policy had obvious recommendations, and its general adoption paid a high tribute to the soundness of their methods. Labour problems were insistent. The formation of mobile transport workers' battalions, however, did much to ease the situation, and by the judicious use of these the flow of goods through the port was well maintained.

After the Armistice, when conditions began to revert to the normal, the Authority were enabled to emerge from the welter of the war period with a strengthened equipment and the satisfaction of having administered their great trust in a manner which showed that the Port of London had during the national emergency proved itself an asset of the very first importance.

Some of the improvements which were available for use during the war have already been mentioned. Others were the widened entrance passage between the basin and the Import Dock of the East India system (1915); widening of the north quay of the West India Import Dock and the construction of three double-storey transit sheds (1916); 43 new electric cranes provided for the Royal Albert Dock (1916); extension of Tilbury Main Dock (1917); and a new cold store at Royal Albert Dock (1918). The Authority were thus in the fortunate position of having been able, despite the war, to prosecute in part at least the improvement scheme they had decided was necessary for the needs of the port. It was useful war work and helped to a speedier recovery when the struggle terminated. It is interesting to recall, too, that important special work was entrusted to them, notably the pontoon bridge between Gravesend and Tilbury. It had to be completed in a month, and the central section was removable so as to allow of the passage of shipping, and a time-limit was fixed for opening and closing operations. This interesting structure, which was required by the military authorities, was completed to time and fully complied with all requirements. Tugs and staffs were kept in constant readiness to work the bridge, which was dismantled when the Armistice was declared. In July, 1915, they undertook another unusual task at the request of the Ministry of Munitions. At that time there was a shortage of 18-lb. shells; so the Authority assisted by providing the machinery for the manufacture of shells and enrolled a volunteer staff from among their employees, who worked after business hours and so carried on until the shortage was made good. They also took charge of the Secret Service examination of all incoming vessels, and their Police Force co-operated with Government Aliens Officials in scrutinising the movements of friendly aliens within the prohibited area of the port.

Dock Improvements.

The docks have a water area of considerably over 723 acres, with 33 miles of quays, enormous warehouse accommodation, and drydocking facilities which are equal to present-day demands, and have recently been supplemented by a new drydock at Tilbury 750-ft. in length and which, should the necessity arise, can be extended to a total length of 1,000-ft. Some features of the development programme have already been mentioned as effected either prior to or during the war period. Among the later works carried out is, of course, King George V. Dock. With the other "Royal" docks, Victoria and Albert, the group has a water area of 245 acres, the largest sheet of dock water in the world. The entrance lock to King George V. Dock is 800-ft. long, with a width of 100-ft. and a depth on sill of 45-ft. The graving dock adjacent has a length of 750-ft. and a width of 100-ft. The north side of the dock is equipped with three pairs of sheds, the top floors of which extend over each pair. The cargo-handling equipment embodies the latest economical practice. On the quayside are eighteen three-ton electric luffing cranes of 60-ft. radius, and there are two lines of railway. The upper floors of the warehouses have a verandah on their quay side on which goods intended for storage are deposited. Under-slung electric cranes of one-ton capacity with five motions move this merchandise as required and also lower it into road or rail vehicles on either side of the warehouse. Runabout electric cranes and trucks operate in other parts of the warehouses and cartage areas, while electric wall cranes are also included in the equipment. The opposite side of the dock, which has a length of over 4,500-ft., is of unique design. Parallel to the quay and 32-ft. away from it are seven dolphins 522-ft. by 22-ft., to the outside of which the ships are moored, the space between quay and dolphins being for barges. Each dolphin has six movable three-ton electric cranes, and cargo is transferred between ship, barge, or adjacent single-storey transit shed, on both sides of which are special facilities for dealing

The Port of London Authority—continued.

with railway traffic. This group of docks enjoys an enormous transit trade, the net tonnage of the shipping using them in a year being about 8,000,000 tons, while 1,200,000 tons of produce pass over their quays.

The most seaward of the London docks are at Tilbury, 26 miles below London Bridge. Here the Authority have made big improvements and are still engaged upon the final stage of a very comprehensive scheme. These docks form the most modern section of the estate, dating back no longer ago than 1886. In 1912 the extension of the main dock was commenced and was completed in 1917. This added 17 acres to the water area, while the capacity for goods was increased by the three transit sheds which were erected.

These additions to Tilbury's facilities, however, required, to be supplemented when the big ships now running between London and Australia were projected. The new scheme included a graving dock 750-ft. by 110-ft. by 37½-ft. and a lock entrance 1,000-ft. long, 110-ft. wide, and 45½-ft. below Trinity high water and equipped with the most modern plant and devices for overhaul or repair work. These facilities came into operation in September, 1929, a year ahead of the contract time.

The part of the scheme, however, which has most appeal to the public imagination is the passenger landing stage, work on which was commenced in 1926. This floating structure has a length of 1,140-ft. and a depth alongside of 30-ft. at low water, so that ocean liners can go alongside and land or embark passengers at any state of the tide. Bridges connect it with a commodious hall for the examination of baggage and the new station which the London Midland and Scottish Railway are building, whilst adjacent is the Tilbury Hotel, of which the Port of London Authority are the proprietors. These new facilities should do much to popularise London as an ocean passenger port. During recent years this business has grown considerably, despite the inconveniences attaching to embarkations or debarkations in dock or by tender.

It says much for the courage of the Port of London Authority that while they were committed to a big and costly scheme at Tilbury they should also have engaged in modernising the West India and Millwall Docks. Their view was that improved accommodation was equally desirable for medium-sized as for the largest class of ships, and despite criticism they resolutely proceeded with both schemes, and the sequel has proved that their policy was the right one, for the new facilities in each section have already given practical proof of their appeal to shipowners. The scheme included a communication passage 80-ft. wide between the South West India Dock and the Millwall Dock; a cutting 350-ft. wide through the quay between the South West India Dock and the West India Export Dock; a passage 80-ft. wide between the West India Import and Export Docks, and a new entrance lock 590-ft. long by 80-ft. wide and 35-ft. to replace the old entrance, which had a length of 484-ft. and a width of 54-ft. The cuttings were completed in 1928, and in the following year the s.s. " Llandovery Castle " demonstrated that the whole of the system was available for the largest ships which proceed as far as this reach of the river. The railways and roads have also been adapted to the new conditions, and adequate warehouse accommodation is in course of erection.

In 1925 the P.L.A. ordered a self-propelling floating crane capable of lifting 150 tons. This vessel, the " London Mammoth," has shown herself to be a very useful asset to the port.

The Surrey Commercial Docks, the only docks on the south side of the river, have been materially developed. Their combined area is 378 acres, and they cater for the Canadian trade and the softwood imports into London. Of these the quantity of timber landed on the quays amounts to well over 450,000 tons in a year, in addition to that discharged overside into barges. Of storage there is 74 acres of storage space in the open and 70 acres under cover, and the improvements carried out have been mainly in the direction of increasing the shed accommodation. New discharging berths have also been provided, and an impounding plant will maintain a constant level of water throughout the whole system.

The P.L.A. and its Staffs.

When the Port of London entered upon their duties they experienced considerable difficulty owing to the fact that the docks were distinct and in some respects decidedly rival organisations, each with its own offices and staffs. Consequently there was no co-operation, and team work was, of course, non-existent. Centralisation was necessary, and this was a slow process. A good start, however, was made by establishing the head managerial department in the offices of the London and India Docks Company in Leadenhall Street. With these as their headquarters, the P.L.A. carried on under circumstances of great difficulty and inconvenience. The position in the midst of shipping and mercantile offices was all that could be desired, but the inelastic accommodation was altogether too circumscribed and a new domicile was decided upon. Fortunately, an admirable site was available. Crutched Friars Warehouse had been taken over by the Authority, and surrounding properties were acquired, so that it was possible to erect a building close to the Tower with the frontages overlooking Seething Lane, Crutched Friars, Savage Row, and Trinity Square. The design of the building which was to do justice to this historic site was thrown open to competition, and 170 drawings were submitted to the adjudication of Sir Aston Webb, R.A. The massive pile which now houses the P.L.A. is generally recognised as worthy of the port. The premises are amply commodious, and there is, in fact, a surplus not required; and lettings, of course, help to swell the annual revenue. The internal arrangements of the building have been specially designed with a view to ensuring efficient and comfortable working conditions, desiderata to which the Authority attach great importance. This interest in the well-being of their employees is manifested in another direction. In 1922 they purchased a piece of land at Ilford and equipped it as a sports ground—a good bargain in real estate, and perhaps even a better one from a point of fostering esprit de corps and enabling their employees to meet in friendly contest their shipping and mercantile confrères.

London's Supremacy.

There are several standards by which the relative positions of British ports may be assessed. One is the value of import and export trade which they handle. Taking this as a basis, London easily occupies first place, as it also does in regard to the volume of shipping using its facilities and the amount of tonnage registered. The total imports and exports of the United Kingdom for the year 1928, exclusive of coastwise goods, were valued at £2,039,460,746, and of this enormous business London handled more than one-third! How this compares with our other leading ports is shown in the accompanying table:—

	Value of Imports and Exports in £'s.
United Kingdom	2,039,460,746
London	692,730,351
Liverpool	485,386,171
Hull	108,349,364
Manchester	98,464,723
Southampton	94,885,022
Glasgow	88,181,943

Shipping Traffic.

The Board of Trade statistics relative to the shipping trade of the United Kingdom as gauged by arrivals and departures of the ships engaged show that London enjoys an overwhelming supremacy.

Thus during the twelve months ending December 31st, 1929, the net tonnage of vessels that arrived and departed from the port was over 57½ million tons. How this compares with other ports is shown in the following table:—

Port.	Arrivals and Departures Net. Reg. Tons.
London	57,540,136
Liverpool	34,851,572
Southampton	25,073,822
Hull	12,016,146
Manchester	8,400,598
Bristol	7,033,046
Other Ports	217,205,157

Arrivals and departures of shipping do not afford an absolute measure of the commerce handled at any particular port, entrances and clearances being swollen in some cases by the calls of vessels for the purpose of landing or embarking mails or passengers, a condition which does not apply to London. The fact remains, however, that the arrivals and departures in the case of the Thames form one-fifth of the net tonnage involved in such movements at all United Kingdom ports, and thus afford striking evidence of the outstanding position of London in the nation's shipping trade and the eminent status she has attained under the regime of the Port of London Authority.

Warehousing Activities of the Authority.

The merchants responsible for the construction of London's first docks aimed not only at the provision of enclosed accommodation for ships but also adequate facilities for the storage of their cargoes until occasion called for their distribution. Since those days warehousing has always been an important part of the services rendered by the dockowners, the markets so long established in London demanding that it should be so. The business has so developed that to-day the Authority are the biggest warehouse-keepers in the world. In this capacity they perform many other duties than those attaching to simple storage or the dispatch of goods through sheds specially designed and equipped for transit. This is a feature of modern trade economics which is far more pronounced in London than other ports and has naturally led to the concen-

The Port of London Authority—continued.

tration of commodities at particular docks, an arrangement which, as long experience has shown, best meets the needs of the mercantile community.

"Floreat Imperii Portus."

The prosperity of the Port of London seems well assured. The forebodings of declining trade which existed when the Authority took over the administration have long been dissipated, and shipping and commerce have well responded to the methods employed in attracting them and catering for their requirements. The developments of the dock estate, both extensively by additional accommodation and intensively in the matter of adaptation and equipment, has anticipated the prospective demands of the shipping and mercantile interests for some years at least. This has necessitated the expenditure of some £16,000,000. Interest charges have been met, the statutory conditions relative to sinking and reserve funds complied with, and the port maintained in a high state of efficiency. The Authority can therefore review its twenty-one years' stewardship in the satisfaction of knowing that they have achieved the "almost impossible," and may face the problems of their third decade, whatever they may be, with the confidence begotten of previous success.

The population of the London area is increasing enormously, and this implies a bigger demand for foodstuffs; there has been a rapid increase in the development of industries in the South of England, more especially in the vicinity of London, since the war. Its distance from the coalfields is a negligible handicap thanks to the cheapest of sea transport; while, should oil supersede coal as the fuel of industry, then at Thameshaven there are the largest oil depots in the world. New factories are springing up with mushroom rapidity, not only on the banks of the river, but in its nearer hinterland, and hence increased imports of raw materials and output of manufactured products, for which London's docks are the natural inlet and outlet, and which are, thanks to the enterprise of the Authority, admirably equipped for the work. At the same time, it is impossible to refrain from expressing regret that the magnitude and importance of the task which has been accomplished in conserving to London its markets and its trade are not appreciated as they should be. Too much is taken for granted, and the great service rendered by the members of the Authority is apt to be overlooked. Their duties, which are entirely voluntary and very exacting, must necessarily interfere with their private business. Still, these sacrifices are cheerfully undergone in the interests of the port. The pity is that their local patriotism is not reflected to a greater extent in the attitude of the public, to the majority of whom "dockland" and all it stands for is a *terra incognita* indeed. They are singularly unaware of the fact that the flow of commerce along the Thames is as vital to the existence of London as the Nile flood to Egypt. Perhaps the passenger landing stage will lead to an awakening of interest, especially as the Authority do not now hide their light altogether under the proverbial bushel. One very practical field in which local patriotism might usefully co-operate in the work of the P.L.A., and so facilitate the business of the port, is in the matter of the roads used by dock traffic. If the powers concerned recognised their obligations and helped to speed up such transport, dock traffic problems would be greatly simplified.

Twin-screw Turbine Steamer "Lady of Mann" Launched.

THE latest addition to the fleet of the Isle of Man Steam Packet Company, of Douglas, is the turbine steamer "Lady of Mann," built by Messrs. Vickers-Armstrongs, Ltd., at Barrow-in-Furness. The ship was launched on March 4th by Her Grace the Duchess of Atholl.

This is a twin-screw vessel with a speed of 22 knots and built to carry about 2,700 passengers. Her principal dimensions are as follows:—Length over all, 373-ft.; length B.P., 360-ft.; breadth moulded, 50-ft.; depth moulded to shelter deck, 26-ft. 6-in.

The "Lady of Mann" was built under special survey of Lloyds for their Class A1 Shelter Deck, for service in the Irish Channel. She will have Board of Trade Passenger Certificates Steam 2 and Steam 3, and complies with the latest requirements for the safety of life at sea for a vessel of this class.

A cellular double bottom is fitted abaft the boiler space and is used for carrying water ballast and feed water. The fore and after peaks are used for water ballast, and a trimming tank is also fitted forward. Deep tanks, extending up to the lower deck, are fitted immediately forward of the forward boiler room for the storage of oil fuel. Ten watertight bulkheads are fitted all extending to the main deck, and the fore end of the oil fuel tanks and the after end of the trimming tank form additional bulkheads extending to the lower deck. Five of these bulkheads are fitted with a watertight sliding door, operated by the Stone system of hydraulic power and all controlled from the navigating bridge.

Two rudders are fitted, one forward and one aft, each operated by independent steam steering gear controlled from the bridge by means of telemotor gear. The after rudder is of the well-known Oertz type.

There are five decks in the "Lady of Mann"—boat, promenade, shelter, main, and lower. The boat deck is about 190-ft. long, and the promenade deck about 266-ft. long, while the shelter and main decks extend for the full length of the vessel. The lower deck is fitted from the after end of the engine room to the after peak bulkhead and from the fore end of the boiler room to the fore peak bulkhead.

The passenger accommodation embodies the latest improvements in the equipment of a holiday passenger vessel of this type. Twelve private cabins are provided, fitted with sofa berths and washbasins. The public rooms for the first-class passengers comprise a tea room, with buffet adjoining, and a ladies' saloon, with lavatory accommodation adjoining, on the promenade deck; a smoke room with a bar and a large lounge with buffet on the shelter deck; a dining saloon to seat 92 persons on the main deck forward; and three saloons on the lower deck forward, accommodating in all 144 passengers. The third-class rooms comprise an entrance hall on the shelter deck aft, with stairs leading down to a dining saloon and lounge and also to a ladies' saloon on the main deck; two saloons also being provided on the lower deck, accommodating in all 90 passengers.

Large promenading spaces are provided on the shelter and promenade decks, and arrangements are made to shut off large portions of these spaces from bad weather by means of Beclawat frameless glass sliding windows at the ship's side.

The deck equipment comprises a combined steam windlass and capstan forward for working the anchors, cables, and warps, two steam and hand capstans aft for warps, four electric boat winches on the boat deck, steam steering gear aft for the after rudder, and steam steering gear forward for the forward rudder.

Submarine signalling apparatus is installed, together with wireless telegraphy.

Electric light is fitted throughout the vessel, the current being supplied by two generating sets in the engine room, each of 130-k.w. capacity. An emergency installation of 35-k.w. capacity is fitted on the main deck.

The "Lady of Mann" is rigged as a two-masted fore-and-aft schooner and when complete will be, both in appearance and equipment, a most pleasing and useful addition to her owner's fleet.

Propelling Machinery.

The vessel is to be propelled by two sets of Parsons geared turbines driving twin screws, each set comprising one high-pressure impulse reaction turbine and one low-pressure all-reaction turbine, connected through flexible couplings to nickel-steel pinions driving the main gear wheel mounted on the propeller shafting.

The total shaft horse-power developed by both sets is to be 11,500, while the astern power will be 70 per cent. of the ahead power.

The gearing is of the double helical type, with teeth of the Vickers Bostock Bramley patent enveloping tooth form.

The condensers are of regenerative type, placed in the wings of the ship and directly connected to the bottom halves of the low-pressure turbines, and designed to maintain a high vacuum with maximum condensate temperature.

Michell thrust blocks will be fitted on the thrust shafts.

Steam is to be supplied by two double-ended and two single-ended cylindrical boilers fitted in two boiler rooms and arranged for oil burning only under Howden's system of forced draught, air being supplied by three electrically driven double-inlet fans.

There is a very complete installation of auxiliary machinery. All pumps are steam driven, with the exception of the motor-driven emergency bilge pump. The engines driving the centrifugal circulating pumps are of the compound type; the main air pumps are of Weir's "Paragon" type with steam-jet air ejectors.

To meet the requirements of the Board of Trade, a fire foam installation will be provided for fire extinguishing purposes in the boiler rooms.

The machinery has been constructed to the requirements of the Board of Trade and Lloyds.

Italian Harbour Affairs.

THE detailed statistics regarding trade at Italian ports in 1929 have just been published by the Istituto Centrale di Statistica and from this official information the following schedule is obtained:—

		Arrivals. No.	Arrivals. N.R.T.	Tons of Goods.	Clearances. Tons of Goods.
Savona—					
1929	...	2,174	2,334,546	1,928,364	94,283
1928	...	1,772	1,664,450	1,467,023	87,721
1913	...	4,610	2,007,592	1,660,616	123,073
Genoa—					
1929	...	10,808	20,140,695	6,831,241	1,098,452
1928	...	10,450	20,069,362	7,164,557	1,032,676
1913	...	12,383	14,457,442	6,214,184	1,231,822
Leghorn—					
1929	...	7,184	6,923,882	1,679,221	435,990
1928	...	6,605	6,605,523	1,584,856	412,067
1913	...	8,835	5,421,673	1,270,869	389,521
Civitavecchia—					
1929	...	2,809	3,297,158	869,421	133,861
1928	...	2,415	2,552,903	797,670	122,552
1913	...	2,610	1,770,280	597,458	74,310
Napoli—					
1929	...	18,660	19,553,387	1,694,609	434,593
1928	...	18,683	18,760,041	2,004,151	401,352
1913	...	28,225	18,538,131	1,907,552	511,658
Brindisi—					
1929	...	2,201	3,976,309	76,592	19,282
1928	...	2,152	3,530,072	78,094	13,621
1913	...	3,205	4,015,766	246,680	63,256
Bari—					
1929	...	3,652	2,747,400	323,205	82,928
1928	...	3,838	2,612,856	367,654	59,703
1913	...	3,566	2,322,463	360,895	91,503
Ancona—					
1929	...	4,978	2,417,628	556,673	73,334
1928	...	4,701	2,678,308	731,912	32,266
1913	...	7,222	2,645,616	780,222	133,448
Venice—					
1929	...	7,977	8,256,606	2,585,773	423,026
1928	...	6,868	7,618,241	2,465,857	332,970
1913	...	8,077	4,602,783	2,287,875	375,060
Trieste—					
1929	...	31,749	10,248,085	2,240,605	876,333
1928	...	30,186	9,620,025	1,994,481	827,293
Fiume—					
1929	...	12,570	4,935,138	523,141	385,281
1928	...	12,799	4,793,512	502,692	378,109
Messina—					
1929	...	6,028	3,892,038	387,273	108,890
1928	...	5,178	4,020,853	381,884	109,725
1913	...	4,944	4,638,376	387,911	191,029
Catania—					
1929	...	5,290	3,807,023	479,147	177,199
1928	...	5,723	3,612,430	548,976	156,841
1913	...	8,373	4,871,809	556,036	324,717
Siracusa—					
1929	...	3,225	3,013,246	98,569	68,734
1928	...	3,050	2,858,824	108,002	64,718
1913	...	3,876	2,564,982	93,141	105,270
Palermo—					
1929	...	6,672	5,976,883	640,618	151,154
1928	...	8,680	6,217,955	650,770	142,985
1913	...	7,868	6,930,037	622,815	267,048
Cagliari—					
1929	...	2,425	1,594,726	230,311	262,019
1928	...	2,612	1,627,637	229,113	292,380
1913	...	2,468	978,799	193,072	216,892

If these various figures are examined in detail, it will be seen that at certain ports such as Genoa, Naples, Catania, etc., where the imports of wheat represented an important part of traffic, import trade has decreased as a whole with the exception of Leghorn, Civitavecchia, Venice, etc., where the decreased imports of wheat have been replaced by the arrivals of other commodities, or as in the case of Palermo by the increased general merchandise trade favoured by the development of regular shipping connections, and 1929 has been a rather prosperous year in Palermo from this point of view, as several foreign and Italian lines have increased their sailings from Palermo to the United States of America, while new express services have been established between Palermo and Tripoli. If one excludes Messina, exports by sea have increased from practically every Italian port under review and this, with the exception of Trieste, where there has been a good deal of transit export trade going on, shows an increased production of the country while it is a sign of the prosperity of the agricultural exports, particularly from Sicilian ports. As a matter of fact if one takes oranges and lemons, the typical Sicilian products, it will be seen that the exports of oranges reached, in 1929, 924,477 centals (794,137 in 1928), while exports of lemons reached 2,289,786 centals (2,218,278 in 1928). A noteworthy increase has also been noticed in the exports of sulphur: 2,218,358 centals in 1929, against 1,923,475 in 1928, which shipped from Catania, Licata and Porto Empedocle in Sicily.

However a better idea of the development of Italian shipping can be had through the examination of the statistics concerning the most important goods imported at the greatest Italian ports, as is shown from the following schedule:—

	January to December, 1929. Coal. Tons.	Phosphates. Tons.	Cereals. Tons.	Cotton. Tons.
Genoa	3,050,173	207,083	1,031,058	210,150
Savona ...	1,649,577	—	—	—
Leghorn ...	1,160,511	59,849	101,624	2,956
Civitavecchia ...	621,647	9,340	71,533	420
Naples	909,524	2,087	328,295	10,257
Palermo ...	287,158	8,777	29,947	—
Catania ...	161,207	—	69,351	—
*Trieste ...	560,282	—	166,140	51,871
Fiume	51,032	33,748	1,378	323
Venice ...	1,328,174	142,549	311,158	46,568
Ancona ...	378,374	53,557	24,298	146
Bari	128,821	—	51,203	—

* Figures covering the period January—October only.

Since it is not possible to have the correct figure for the whole of 1929, as the period regarding the port of Trieste covers only three quarters of the year, it is impossible to make an exact comparison. However, if one takes coal, for example, it will be seen that the total imports during 1929 reached 11,480,927 tons (9,153,612 tons in 1928), of which about 10,300,000 tons have been imported by sea. This might give an idea of the importance which the coal trade has in the harbour traffic.

However, these figures are not illustrating the position of trade at various ports from ths shipowners' point of view. For this purpose it is necessary to consider that the participation of the Italian flag to trade between Italian and overseas ports has grown from about 5,286,133 tons in 1913 to 10,832,923 tons, while the participation of the foreign flag, which used to be 13,262,705 tons in 1913, is now 10,895,265 tons. Spanish and Greek owners used to take an important part in the Italian coal trade, but they have practically disappeared, and much progress has been made by the Jugoslav flag.

Statistics for January, 1930, have already been published, and the total of trade unloaded and loaded reached 3,066,512 tons against 2,897,738 tons in December, 1929, and 2,709,622 tons in January, 1929. If one considers that usually the first month of the year shows a depression, it cannot be denied that things are very promising.

Efforts are being made to improve the situation by increasing the speed of unloading and loading in order to reduce expenses. New cranes are being fitted both at Genoa and Venice, while it appears that new grain sylos are to be erected at Leghorn and Fiume, and that the coal bunkering mechanical appliances are to be transformed.

The most striking event of the month, however, has been the decision of the Italian Government to put an end to the Jugoslavian Blockade against the port of Fiume by the declaration of the district of Fiume to be a free port from the Customs' point of view. According to the decree which has been approved by the Italian Cabinet, a large zone in the harbour of Fiume running from the bay of San Giovanni, near Moschiena through the Monte Maggiore, Apriano, Mattuglie up to the mouth of the Eneo River marking the Italo-Jugoslav frontier is to be declared free from Customs' supervision. In this zone, which measures about 30 square kilometres, it will be possible to import and store, manufacture, etc., goods, for example, from the United Kingdom without paying any Customs duty except when these goods are to be exported into the Italian Kingdom or into Jugoslavia. An exception is made for tobacco and cigarettes, and for liquor, and it is intended evidently to safeguard the interests of Zara, where the tobacco and liquor industries have grown very considerably. According to the decree which is to be put into effect on April 1st, 1930, it will be possible to maintain the Customs supervision on those factories which are producing goods sold in Italy, and the prosperity of which depends entirely from the Italian market. As a first result of this step, it is expected that prices are to decrease, and through the decline of cost of living, it will be possible to cut down unloading charges, storage tariffs, etc., in the port. However, it appears that what the Government intends to reach is the possibility of developing the port of Fiume from an industrial point of view as it is quite comprehensible that with the cheap labour, and the possibility to avoid the payment of duties many industries will have an advantage in establishing their headquarters in Fiume, particularly with the view of export toward the Balkan countries. Under these circumstances it is expected that the creation of the free zone in Fiume cannot affect shipping at other Adriatic ports such

Italian Harbour Affairs—continued.

as Trieste and Venice, the source of life of which is international transit trade, and which have obviously different hinterlands; Venice serving Switzerland and Bavaria, Trieste, Austria, and the Czechoslovakia and Fiume part of Jugoslavia and Hungary.

In this connection it should be noted that a meeting has just been held at Genoa by the representatives of the German, Austrian, Czechoslovakian, Hungarian, Jugoslavian and Polish railway administrations and of the representatives of the Lloyd Triestino and of the Cosulich Line with a view to examining the question of the development of Central European transit trade through Hamburg and Trieste. It would appear that an understanding has been reached and that a league between Adriatic and North Sea ports has been established.

Scottish Harbour Notes.

A Mid-Scotland Ship Canal.

IN accordance with a recent remit the Parliamentary Bills Committee of Glasgow Corporation has considered the question of the proposed construction of a Mid-Scotland ship canal, and, after consideration, this committee recommended to the Corporation that the Government should be asked to have this matter investigated by neutral engineers and that (if desired) the Corporation should offer before the Government Commission which has been appointed evidence of the benefits—both local and national—likely to accrue from the carrying out of this project. In an interesting report on the subject the Parliamentary Bills Committee strongly approved of the Government's action in re-opening an investigation into the possibilities and advantages of a sea level passage for ships through the industrial centre of Scotland, between the Forth and the Clyde, in view of the great and unique facilities in the way of cheap carriage by water which would thereby be provided for trade and commerce and for the establishment and development of factories.

"This committee," the report proceeds, "approve of the Government's action especially in view of the fact (1) that according to recent Government reports there is a great movement of industry to the south (particularly in the neighbourhood of the Thames) due largely to the facilities for export furnished by the Port of London; (2) that it would greatly tend to encourage the growth of industry on which the prosperity of Scotland depends; and (3) that it would afford an exceptional amount of steady employment for a very large number of men over a period of years; but, as the information so far obtained as to cost of construction is so incomplete, they recommend that the Government should be asked to have the matter thoroughly gone into by neutral engineers and investigated from all aspects."

Wick Harbour Board's Debt Cancelled.

Wick Town Council have agreed to cancel a debt of £3,089 due to them by Wick Harbour Board less the sum of £750 which has been repaid by the Trustees and which the Town Council has expended on local improvements. This indebtedness was incurred by the Town Council during the war when the local harbour could not pay its way and when a rate of one shilling in the pound was levied by the Council. Owing to trouble with the Fishery Board the sum of £750 repaid by the Trustees had to be refunded to them by the Council, but, as the money had been spent as stated, the Council had to borrow the amount which they did from the Bignold Hospital Trustees on the security of the harbour rate. The general cancellation has been rendered necessary owing to a stipulation of the Treasury in its offer for the reduction of harbour debts and to facilitate the sanctioning of a scheme for the improvement of the harbour so that the work could be begun at an early date.

Proposed Extension of Bo'ness Dock.

At a recently-held meeting of Bo'ness Town Council, Provost Simpson—who headed a recent deputation to London on the subject of the proposed extension of the local dock—officially reported that they had put forward to Sir Ralph Wedgwood and other officials of the London and North-Eastern Railway Company two schemes for improvement with relative plans. These schemes Sir Ralph promised to investigate and to forward report thereon for consideration of the local town Council. When this report arrived (Provost Simpson continued) the whole matter would be submitted to a meeting of the Dock Extension Committee, but he wanted the Council to understand, however, that this matter would not be closed even if the Railway Company's report was of an adverse character. The Bo'ness Town Council deputation (it was further added) was officially introduced by Mr. Edward Shinwell, Member of Parliament for West Lothian.

Aberdeen Fish Market to be Reconstructed and Extended.

It is intimated by the Docks and Pilotage Committee of Aberdeen Harbour Board that they have approved of a report in connection with the re-construction and extension of the Aberdeen Fish Market. This report states that there was submitted to the sub-committees a report by the Harbour Engineer from which it appeared that the extension of the wharf at the Commercial Quay for a length of 350-ft. had now been completed by the Harbour Commissioners, and that the extension of the Fish Market by the Town Council on this site for a length of 300-ft. was proceeding. The total cost of the extension of the wharf would amount to approximately £17,290, to be borne equally between the Town Council and the Harbour Board. The original estimate of the work was estimated at £32,300, and later the estimated cost was reduced (by adopting a different type of construction) to £22,300.

Replacement of Buoys at Dumbarton.

At a recently-held meeting of Dumbarton Harbour Board a report by the local Harbour Master indicated that on his examination of the banks of the River Leven he found everything in normal condition, but calling attention to the difficulty pilots leaving the Leven had in knowing where the west bank was situated owing to the disappearance of the buoys there. All had disappeared (he added) with the exception of a tin he had sunk beside the Perch. The matter was remitted to the Works Committee and Harbour Master to replace the necessary buoys.

Government Grant for Protection Wall at Macduff.

Great satisfaction was expressed in Macduff at the announcement that a Government grant of £4,000 is being given towards the cost of the construction of a protection wall at the harbour slipway which cost £20,000. The slipway has been threatened by erosion despite the sinking of craft filled with cement and hundreds of tons of boulders into the cavity washed out by the action of the sea. The full scheme put forward by the Council was estimated to cost £12,000 including dredging the harbour, general repairs, and the construction of a new accommodation road. As the slipway was being seriously threatened by continued erosion, the Council are gratified that this part of the scheme has been sanctioned and hope that the remainder will be granted in due course.

Loan for Improvement of Whitehall Harbour.

Orkney Harbour Commissioners have had under consideration a letter from the Treasury offering a grant of £15,000 towards the estimated cost of £45,000 for the improvement of Whitehall Harbour at Stronsay. The grant is conditional upon the Commissioners obtaining additional borrowing powers, and on increasing the dues on herring landed at Whitehall Harbour to enable the loan to be financed. The Treasury's offer of this grant has been very favourably received locally.

Opposition to Filling-in of West Harbour, Port Glasgow.

Opponents of the proposed filling-in of the West Harbour at Port-Glasgow are conducting an active campaign against the scheme proposed by the local Town Council, and the "Greenock Telegraph," in an interesting article on this subject, expresses the view that this opposition is a little belated. "This opposition," this article observes, "comes mainly from men who naturally resent the prospect of losing facilities they have hitherto enjoyed for the accommodation of their boats. They contend that the whole scheme is illegal, and that the Harbour Trust have no right to sell and the Town Council no right to purchase. The Town Council (it is understood) maintain that in accordance with certain Acts of Parliament they are entitled to purchase the harbour. Apart from the legal aspect, Greenock folk (with a lively recollection of recent controversies on the same subject) will be inclined to sympathise with those who now raise objection because they believe they are to be deprived of the use of the water-front."